M.A. Lance

SINGLE SWITCH TASKS WITH CHILDREN:

ANALYSIS CONSIDERATIONS

APPENDIX

CONTENTS

APPENDIX ONE

SOFTWARE ALGORITHMS

The software which controls the computerised cause and effect task as a subject interacts with it is is divided into two seperate programs. There is a foreground control task (written in high level FORTH) and a background interrupt-driven data gathering task (written in machine code). These two independent tasks both operate according to a simple multitasking system. The tasks synchronize their activities and communicate their states to each other by means of semaphore variables. These are variables written to by one of the programs as soon as it changes its own internal status in any way. The other program reads the semaphore at its own leisure, when it needs the information.

Data Gathering Task

All time critical processing is performed by a routine activated by a hardware generated interrupt, synchronised with the end of the screen update every 1/5Ø second. This interrupt stops the activity of the processor, and executes a low level machine language routine via an address vector. The interrupt routine has the responsibility for saving the status of the processor, executing its own code, restoring the processor status, and gracefully restarting the main program again. The speed and regularity of the interrupt routine means that it can be regarded as executing "simulateously" with the main routine.

APPENDIX 2

The first timing task, carried out at the start of each interupt is to increment a counter. This counter then acts as a software real-time clock, providing measurements accurate to within 20 milliseconds. Next, switch status is polled and if a change is detected the clock time is recorded. The time is also recorded whenever the control routine semaphores that it is starting a reward period, as is the particular value of the semaphore, which is then reset to zero. (This provides the data gathering routine with the capability to collect comparable data from more complex tasks, which can signal various changes in their state by storing different values in this semaphore location.) The interrupt routine stops collecting data once it has recorded 255 values.

```
\*interrupt_routine*
SAVE_REGISTERS
Clock := Clock + 1
\ continue only if no data overflow will occur
IF Data_full_flag .NE. True
THEN
     \ gather reward data
     IF  Event_flag .NE. Ø
     THEN
          Event_type_array ( Event_index ) := Event_flag
          Event_time_array ( Event_index ) := Clock
          Event_flag := Ø
          \ reset so more can be detected
          Event_index := Event_index + 1
     ENDIF
     \ gather switch data
     IF  SWITCH .NE. Last_switch_state
     THEN
          Last_switch_state := SWITCH
          Switch_time_array ( Switch_index ) := Clock
          Switch_index := Switch_index + 1
          \ prevent data overflow
          IF   Switch_index .EQ. 256
          THEN
               data_full_flag := True
          ENDIF
     ENDIF
ENDIF
RESTORE_REGISTERS
EXIT
```

Pseudo-code representation of the algorithm for the data gathering interrrupt routine.

APPENDIX 4

Control Task

In contrast to the rapidly executing interrupt routine, the surface control program is written in a slower executing high level language and devotes most of its resources to controling reward presentation. When it needs to know about the occurrence of an event or the passing of time duration, it looks up the semaphore variables continually updated by the interrupt routine. It reacts when the contents of semaphores have passed a critical value or changed from their last known value.

The control routine begins with all rewards turned off and can move into one of two states: reward delivery and ending. The task ends if either the clock semaphore exceeds five minutes or a semaphore indicates that the data collecting routine has reached its limits for data storage. Reward activation occurs when a semaphore indicates switch activity. This semaphore is actually the offset index increased by the data gathering routine every time it stores the time of a switch state change. After rewards have been activated, run for their duration, and deactivated, the control routine re-reads and records the value of this index again. Any change from this new value will indicate more switch activity while the reward is inactive, triggering yet another reward. To allow recording of the precise timing of the start of reward activation, the control program sets a semaphore just before it begins the reward.

```
\*surface_program*
\ initialization
Event_flag          := Ø
Event_index         := Ø
Switch_index        := Ø
Clock               := Ø
Switch_count        := Ø
Data_full_flag      := False
Last_switch_state   := Off
START_INTERRUPT_PROGRAM
\ main loop
BEGIN
  IF Switch_index .GT. switch_count
  THEN
  \ a response has been signaled by the interrupt
program
    Event_flag := 255
    \ semaphore set to enable time to be recorded
    START_REWARD
    WAIT
    \ for the preset time period
    STOP_REWARD
    Switch_count := Switch_index
  ENDIF
IF Data_full_flag .EQ. False AND Clock .LT. 5_minutes
THEN
REPEAT
STOP_INTERRUPT_PROGRAMME
SAVE_DATA
END
```

Pseudo-code representation of the algorithm for the high level control task.

Psuedo-code Listing Conventions

- All comments are in lowercase on a line preceeded by a backslash

e.g.

\ a typical comment

- Data storage structures have lower case names but begin with a capital letter.

e.g.

Clock

Event_flag

- Control structures are shown in uppercase and underlined.

e.g.

BEGIN REPEAT

IF THEN ENDIF

- Boolean truth tests follow FORTRAN conventions.

e.g.

.EQ. .NE. .GT. .LT.

- Executable procedural statements are in uppercase.

e.g.

START_INTERRUPT

WAIT

- Assignment is denoted with the target data structure to the right and the value to be assigned to the left.

e.g.

Clock := Ø

APPENDIX TWO

DATA TABLES FOR CASE STUDY ONE

This appendix contains numeric tables of the raw data for the first case study which involved a pictorial reward version of the cause and effect task. Each line beginning with an asterix ("*") denotes data for a seperate reward period. Immediately following each asterix is the time of the switch state change which initiated the reward period. All subsequent switch state change times within that reward period appear on the same line, or an indented following line. All values are times of a change of switch state as an offset from the start of the task. Times are stated in intervals of 1/50 of a second (jiffies). Following each time is either a "v" indicating that the switch was pressed or a "^" to indicate a switch release.

APPENDIX 8

Batch 1

```
*  3099v  3107^
*  3815v  3828^
*  4129v  4142^
*  4876v  4888^  5086v  5098^
*  5506v  5525^
*  6145v  6163^
*  6764v  6785^
*  7304v  7316^
*  8060v  8119^  8135v  8145^  8170v  8171^  8187v  8189^
   8203v  8206^  8217v  8221^
*  8398v  8417^
*  8735v  8748^
*  9459v  9479^  9620v
*  9791^
* 10537v 10568^ 10607v 10725^
* 10847v 10873^ 10979v
* 11617^ 11630v 11646^ 11669v 11688^ 11721v 11724^ 11735v
  11738^
* 11963v 11987^ 11996v 12005^ 12016v 12021^ 12031v 12035^
  12069v 12091^
* 12600v 12731^
* 13045v 13173^ 13225v 13230^
* 13453v
* 13789^ 13792v 13850^ 13864v 13898^ 13984v
* 14114^ 14360v 14387^
* 14423v 14534^
```

APPENDIX 9

Batch 2

```
*      0v
*    718^    783v    793^
*   1549v   1572^
*   2163v   2184^
*   4780v   4793^   4901v   4916^   4956v   4976^   5015v   5048^
*   5176v   5191^   5234v   5251^   5289v
*   5639^   5682v
*   6224^   6274v   6371^   6383v   6402^   6419v   6438^   6449v
    6455^
*   6557v   6594^   6617v   6660^   6676v   6826^
*   6890v   6907^   6938v   7146^
*   7219v   7238^   7248v
*   7531^   7789v
*   7807^   7876v   7924^
*   8129v   8146^
*   8534v   8554^
*   8981v   9010^   9034v   9168^
*   9435v   9682^
*  10116v  10131^  10246v  10336^
*  10438v  10464^  10521v  10659^
*  10913v  10939^  11051v  11078^  11098v  11123^  11147v  11174^
*  11207v  11289^  11307v  11327^  11349v  11358^  11383v  11401^
   11427v  11447^  11474v
*  11493^  11520v  11536^  11560v  11570^  11592v  11601^  11620v
   11647^
*  12306v  12323^
*  13703v  13718^
*  14005v  14027^  14039v  14088^
*  14826v  14840^  14964v  14978^  14995v  15039^  15088v  15092^
```

APPENDIX 10

Batch 3

```
*   385v   396^
*  1008v  1021^
*  1284v
*  3279^
*  4169v  4185^
*  4726v  4775^
*  5578v  5599^
*  6835v  6839^  6942v  7004^
*  7517v  7574^  7664v  7776^
*  7913v  7929^
*  8258v  8266^  8316v  8322^  8323v  8324^  8327v  8328^
*  8848v  8855^
*  9306v  9329^
*  9931v  9937^
* 10299v 10304^ 10307v 10308^
* 10698v 10701^ 10706v 10710^ 10715v 10716^
* 11626v 11635^ 11640v 11641^
* 12488v 12497^ 12515v 12517^ 12527v 12531^
* 12915v 12943^
* 13907v 13912^
* 14321v 14324^ 14331v 14336^ 14346v 14583^ 14584v 14585^
* 14642v
* 14959^
```

APPENDIX 11

Batch 4

```
*   211v   213^   215v   233^
*   949v   966^
*  2605v  2608^  2614v  2622^  2682v  2715^
*  4161v  4175^
*  4673v  4689^  4697v  4699^  4701v  4713^  4714v  4715^
*  5200v  5202^  5210v  5211^
*  5763v  5769^  5770v  5771^  5790v  5791^  5792v  5797^
   5843v  5918^
*  6355v  6359^
*  6668v  6810^  6830v  6836^  6862v  6896^
*  7172v  7189^
*  8005v  8023^
*  9125v  9136^
* 10306v 10309^ 10310v 10313^ 10318v 10319^ 10321v 10323^
* 11270v 11271^ 11275v 11276^ 11277v 11283^ 11284v 11290^
  11291v 11292^
* 12749v 12757^ 12763v 12771^ 12779v 12790^ 12791v 12801^
* 14039v 14042^ 14058v 14067^
* 14538v 14545^ 14570v 14571^ 14581v 14584^
```

APPENDIX 12

Batch 5

```
*   500v   503^   529v   537^   566v   575^   638v   657^
*  1198v  1224^
*  1559v
*  1845^  1908v
*  2313^
*  3056v
*  3337^  3537v
*  4006^  4279v
*  4344^
*  5338v  5496^
*  6163v  6215^
*  6585v  6621^  6791v
*  6908^  6995v  7038^
*  7780v  7813^
*  9703v  9722^  9847v  9875^  9900v  9962^  9975v
* 10172^ 10185v
* 10578^ 10617v 10635^ 10723v 10790^
* 10999v 11238^
* 11423v 11494^
* 13110v
* 13450^ 13536v 13688^ 13706v
* 13725^
* 14297v 14322^ 14325v 14374^
* 14751v 14817^ 15003v
```

Batch 6

```
*   364v   378^   510v
*   667^
*  1215v  1324^  1345v
*  1532^
*  2329v  2384^  2445v  2494^
*  2807v  2852^  2913v  2972^  2985v  3008^
*  3159v  3210^
*  3488v  3580^
*  4111v  4322^  4335v  4357^
*  4712v  4819^
*  5297v  5334^  5460v  5553^
*  5605v  5809^
*  5931v  5975^
*  6922v  7001^  7097v
*  7232^  7318v  7332^
*  7921v  7936^
*  8524v  8601^  8741v
*  9345^
*  9732v  9773^
* 10141v 10281^ 10368v 10369^
* 10497v 10501^ 10531v 10592^ 10698v 10719^ 10743v
* 10805^
* 11617v 11637^ 11851v
* 11976^
* 12627v 12635^
* 13033v
* 13661^
* 14109v
* 14916^ 14943v
```

APPENDIX 14

Batch 7

```
*  1804v  1852^
*  2085v  2108^  2167v  2196^
*  2441v  2532^  2621v  2697^
*  2821v  2921^  2963v  3045^  3060v  3092^
*  3173v  3269^  3295v  3372^  3385v  3409^  3421v
*  3447^  3453v  3558^  3592v
*  3731^  3802v  3844^  3935v
*  4006^  4021v  4169^
*  4357v  4463^
*  4706v  4830^
*  4984v  5058^
*  5280v  5351^  5390v  5449^  5461v  5484^  5495v  5521^
   5533v
*  5556^  5564v  5590^  5597v  5703^  5802v
*  5877^  5902v  5996^  6117v
*  6158^  6166v  6186^  6208v  6289^  6308v  6344^  6354v
   6379^  6391v  6416^  6422v
*  6451^  6463v  6480^  6492v  6586^  6669v
*  6869^  6878v  6906^  7072v
*  7219^  7264v
*  7594^  7603v  7626^  7633v  7697^
*  7938v  7998^
*  8484v
*  8842^  8882v  8917^  9112v
*  9142^  9168v  9212^  9237v  9263^  9274v  9296^  9300v
   9328^  9334v  9350^  9363v  9386^  9401v
*  9426^  9443v  9476^  9590v  9653^  9668v
*  9740^  9750v  9770^  9784v  9808^  9848v 10009^
* 10031v 10065^ 10105v 10156^ 10169v 10198^ 10208v 10285^
  10298v
* 10320^ 10333v 10359^ 10378v 10409^ 10425v
* 10616^ 10657v 10771^ 10787v 10812^ 10824v 10850^ 10864v
* 10895^ 10898v 10933^ 10980v 11163^
* 11177v 11292^
* 11480v 11512^
* 11860v 11876^
* 12244v 12289^ 12313v 12469^
* 12544v 12629^
* 12962v 13018^
```

APPENDIX 15

Batch 8

```
*   408v   445^   549v
*  1217^
*  2941v
*  3216^
*  3762v  3766^
*  4323v  4369^
*  4827v  4851^
*  5192v  5290^  5337v  5341^  5352v  5411^
*  5585v  5611^
*  5934v  5959^  6111v  6155^  6179v
*  6252^  6293v  6303^
*  6589v  6598^  6608v  6614^  6621v  6623^  6624v  6625^
   6636v  6638^  6653v  6810^  6814v  6815^
*  6992v  6995^  6997v  6998^
*  7544v  7585^  7596v  7597^  7600v  7634^  7669v  7704^
   7734v
*  7864^  8074v  8075^
*  8427v  8483^  8501v  8526^  8527v  8529^  8530v  8532^
   8538v  8539^  8540v  8551^
*  9268v  9269^  9270v  9283^  9438v  9463^  9465v  9476^
*  9649v  9684^  9688v  9725^  9726v  9727^  9728v
*  9965^  9968v  9970^  9973v  9976^  9977v  9978^ 10006v
  10009^ 10010v 10012^ 10037v 10050^ 10058v 10060^ 10062v
  10068^
* 10478v 10483^ 10629v 10655^ 10700v
* 10891^ 10893v 10895^ 10897v 10898^ 10917v 10928^
* 11595v 11623^
* 11986v 12006^ 12007v 12010^ 12012v 12021^ 12023v 12024^
  12025v 12029^ 12030v 12031^ 12034v 12036^ 12037v 12110^
  12118v 12152^ 12174v
* 12290^ 12303v 12312^
* 12677v 12678^ 12679v 12716^ 12943v 12946^
* 12961v 13012^
* 13350v 13434^ 13510v 13514^
* 13637v 13664^ 13666v 13668^ 13670v 13680^
* 14147v 14178^ 14187v 14188^ 14190v 14197^ 14198v 14247^
  14249v 14250^ 14252v 14254^ 14255v 14293^ 14336v 14340^
* 14560v 14597^ 14609v 14717^
```

APPENDIX 16

Batch 9

```
*     10v     22^
*   1758v   1767^
*   2339v   2467^
*   4022v   4069^
*   4859v   4884^   4886v   4891^
*   8708v   8790^
*   9175v   9416^
*  10335v  10580^  10608v
*  10625^  10629v  10637^
*  12508v  12515^
```

APPENDIX 17

Batch 10

```
*   249v   348^   375v   501^
*  1055v  1059^  1063v  1076^  1083v  1096^  1102v  1129^
   1151v  1191^  1289v  1291^  1292v  1293^
*  1650v  1651^  1683v  1685^  1694v
*  2111^
*  2564v  2566^  2574v  2669^  2717v  2739^  2740v  2741^
*  2889v  3007^  3012v  3017^  3129v  3148^  3155v
*  3173^  3175v  3336^  3339v  3341^  3342v  3354^  3360v
   3362^  3363v  3380^  3400v  3424^
*  3461v  3502^  3651v  3668^  3670v  3672^  3683v  3693^
   3696v  3697^  3701v  3727^
*  3749v  3770^  3801v  3815^  3817v  3851^  3852v  3853^
   3856v  3873^  3874v  3889^
*  4141v  4184^
*  4840v  4854^  4870v  4878^
*  5416v  5467^  5477v  5514^  5552v  5568^  5593v  5614^
   5623v  5644^  5657v
*  5977^  6006v  6017^  6026v  6051^  6124v  6127^  6129v
   6187^  6188v  6212^  6226v  6227^  6230v
*  6258^  6265v  6289^  6297v  6304^  6306v  6307^  6325v
   6327^  6328v  6329^  6343v  6344^  6347v  6360^  6455v
   6483^
*  6537v  6543^  6545v  6564^  6565v  6569^  6570v  6576^
   6577v  6810^
*  6860v  6896^  6941v  7004^  7006v  7007^  7020v  7052^
   7064v  7117^
*  7239v  7267^  7297v  7303^  7438v  7440^
*  7583v  7618^  7657v  7659^  7707v
*  7913^  7920v  7948^  8022v  8025^  8026v  8038^  8051v
   8062^  8065v  8066^  8067v  8068^  8079v  8111^  8112v
   8116^  8117v  8118^  8154v  8155^  8156v  8176^
*  8242v  8260^  8333v  8345^  8358v  8360^  8361v  8369^
   8478v
*  8520^  8565v  8621^  8646v  8653^  8657v  8669^  8670v
   8714^  8715v  8723^  8729v  8731^
*  8811v  8816^  8839v  8843^  8933v  8980^  8994v  8995^
   8998v  9000^  9001v  9007^
*  9383v  9388^  9389v  9435^  9533v  9546^
*  9735v  9767^  9768v  9770^
* 10075v 10130^ 10140v 10141^ 10175v 10176^ 10177v 10182^
  10200v 10204^ 10229v 10235^ 10262v 10279^ 10315v
* 10366^ 10415v 10424^ 10427v 10453^ 10454v
* 10739^
* 11328v 11330^ 11333v 11338^ 11342v 11361^ 11362v 11364^
  11406v 11415^ 11419v
```

APPENDIX 18

Batch 11

```
*     83v    105^    121v    161^    314v
*    593^
*   1857v   2070^
*   2426v
*   2854^
*   3178v   3208^
*   3558v   3608^
*   5150v   5167^
*   6505v   6722^
*   8161v
*   8590^   8838v
*   8874^   9054v   9119^
*   9194v   9202^
*  10672v  10816^
*  11083v  11200^
*  12219v  12302^
*  12976v  13063^
*  13548v  13574^
*  13961v  13978^
*  14688v  14702^
```

APPENDIX 19

Batch 12

```
*  1569v  1581^
*  2341v  2347^
*  2962v  2968^  2971v  3003^
*  3952v  3996^
*  4696v  4726^
*  5162v  5167^  5181v  5207^  5208v  5209^
*  5933v  5943^  5950v  5962^
*  6426v  6453^
*  7308v  7311^  7328v  7329^  7331v  7339^
*  7747v  7791^
*  8171v  8234^
*  8601v  8628^  8634v  8638^
*  8946v  8979^  8981v  8985^  8995v  8996^  8997v  8998^
*  9381v  9415^
*  9730v  9761^
* 10140v 10145^ 10146v 10160^
* 10534v 10549^ 10550v 10589^
* 10902v 10912^ 10913v 10916^ 10917v 10923^ 10924v 10930^
  11134v 11141^ 11142v 11149^ 11150v 11156^ 11157v 11171^
  11172v
* 11178^ 11302v 11303^ 11305v 11306^ 11313v 11314^ 11316v
  11318^ 11327v 11330^
* 11546v 11547^ 11550v 11551^ 11552v 11565^ 11566v 11577^
  11578v 11586^
* 11893v 11969^
* 12218v 12271^
* 12543v 12590^ 12694v 12695^ 12710v 12716^ 12729v 12742^
* 12879v 12902^
* 13559v 13641^ 13643v 13644^ 13645v 13646^ 13647v 13651^
  13658v 13659^ 13660v 13666^ 13668v 13669^ 13691v 13692^
  13706v 13707^ 13709v 13710^ 13711v 13716^ 13718v 13731^
  13733v 13762^ 13763v 13765^ 13766v 13768^ 13769v 13771^
  13772v 13774^ 13775v 13778^ 13779v 13781^ 13782v 13786^
  13787v 13791^ 13792v 13796^ 13797v 13800^
* 13914v 13965^ 13966v 13968^ 13973v 13974^ 13984v 13985^
* 14298v 14299^ 14304v 14305^ 14318v 14319^ 14320v 14321^
  14323v 14324^ 14326v 14327^ 14329v 14330^ 14336v 14337^
  14340v 14341^ 14345v 14346^
* 14703v 14704^ 14705v 14708^ 14709v 14720^ 14721v 14744^
  14745v 14756^
```

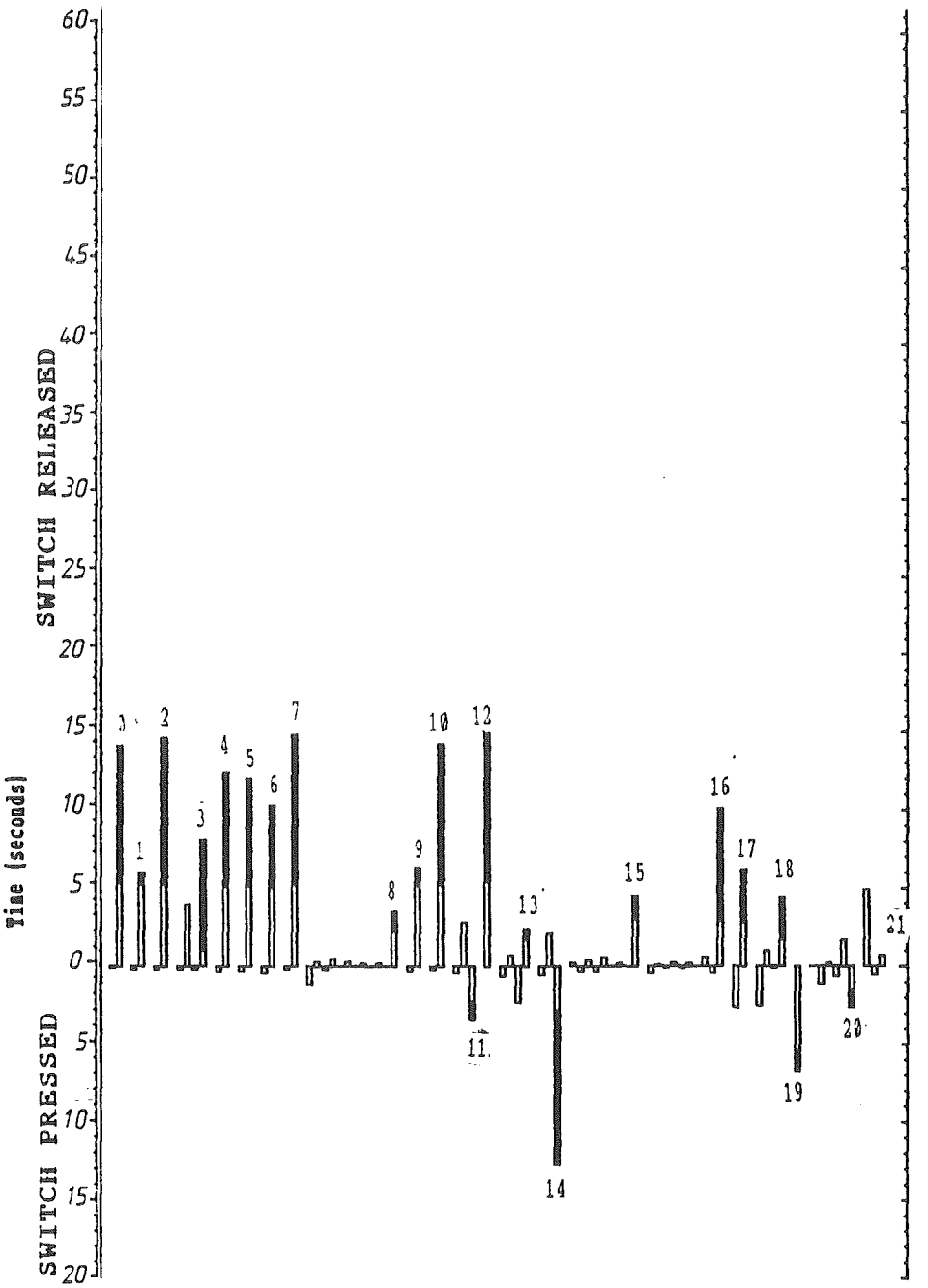
APPENDIX THREE

BAR GRAPHS FROM CASE STUDY ONE

This appendix contains bar graph displays as explained in Chapter VIII. In these displays the duration that the switch is in the alternating up and down states, is shown by the length of bars on the graph. Bars rising above the mid-line depict intervals in which the switch is up, and times for which the switch is held down, are shown in offset bars that fall below the mid-line. The vertical axis is marked in intervals of one second and times are plotted with a resolution of 2/50ths of a second. Reward periods are separated by gaps along the horizontal axis between runs of bars, and are numbered sequentially from the start of the task. These numbers are placed at the end of the last state duration bar of a period. The terminal black shaded area, within each last state duration bar for a reward period, denotes time during which the reward was inactive.

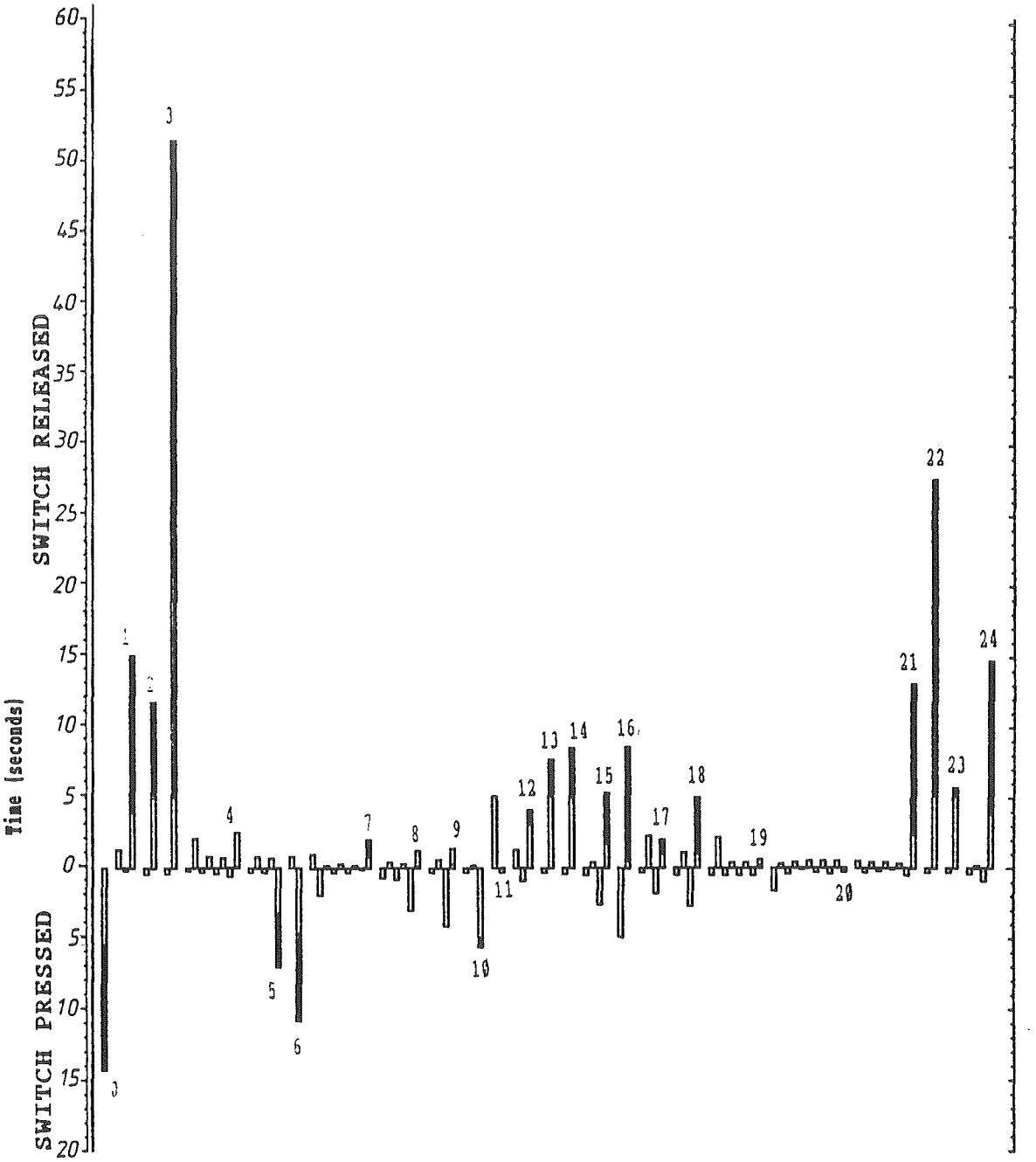
APPENDIX 21

Batch 1

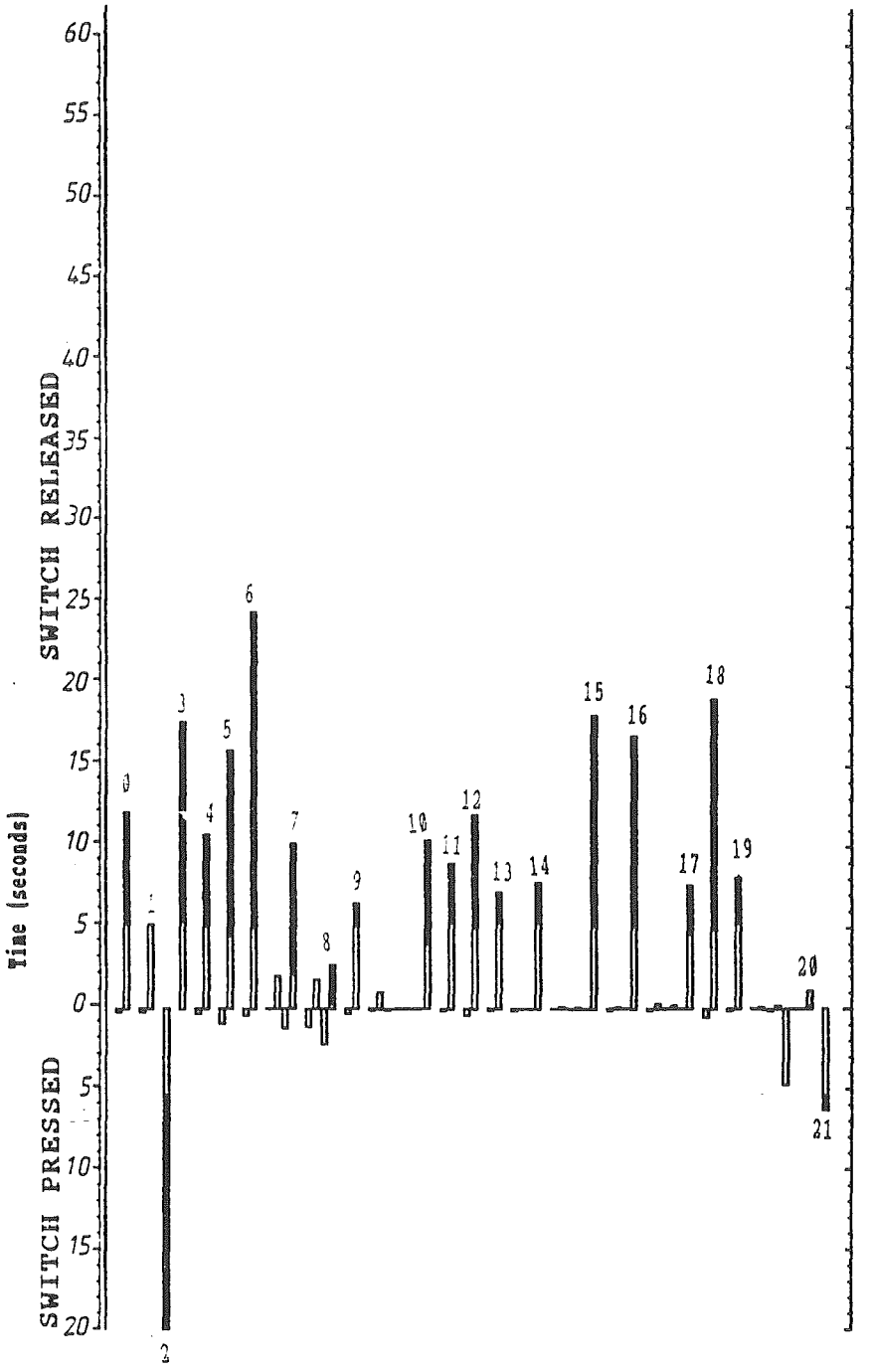


APPENDIX 22

Batch 2

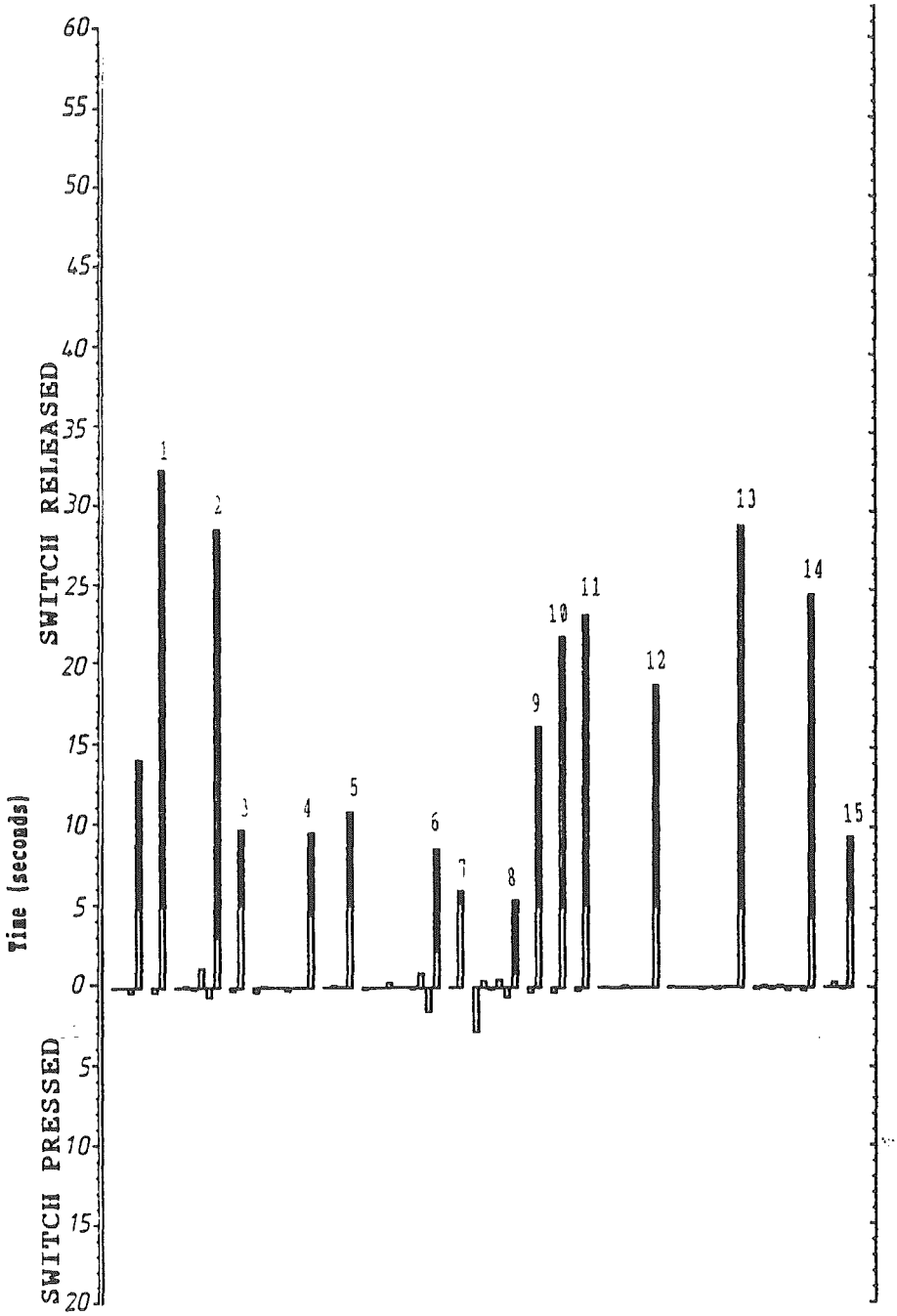


Batch 3

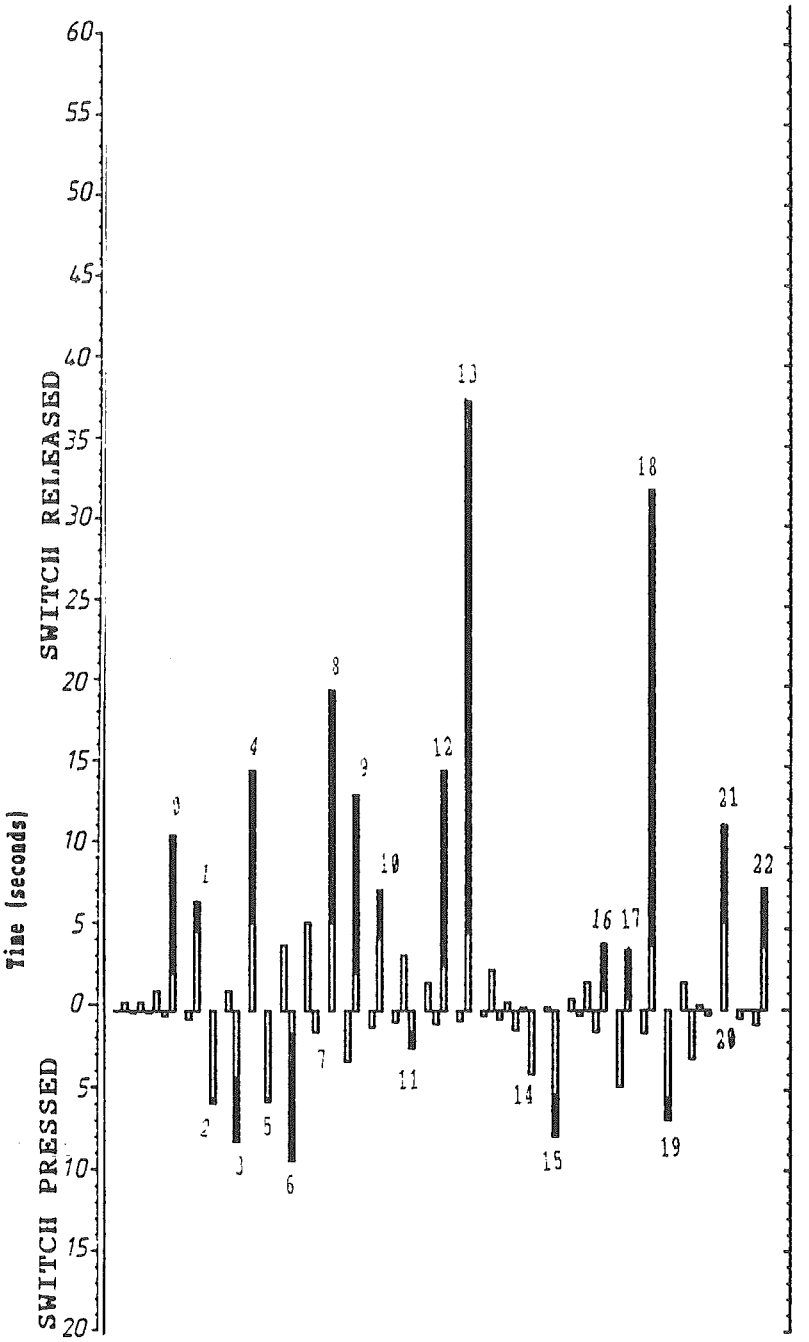

SWITCH RELEASED
SWITCH PRESSED
Time (seconds)
60
55
50
45
40
35
30
25
20
15
10
5
0
5
10
15
20
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21

APPENDIX 24

Batch 4

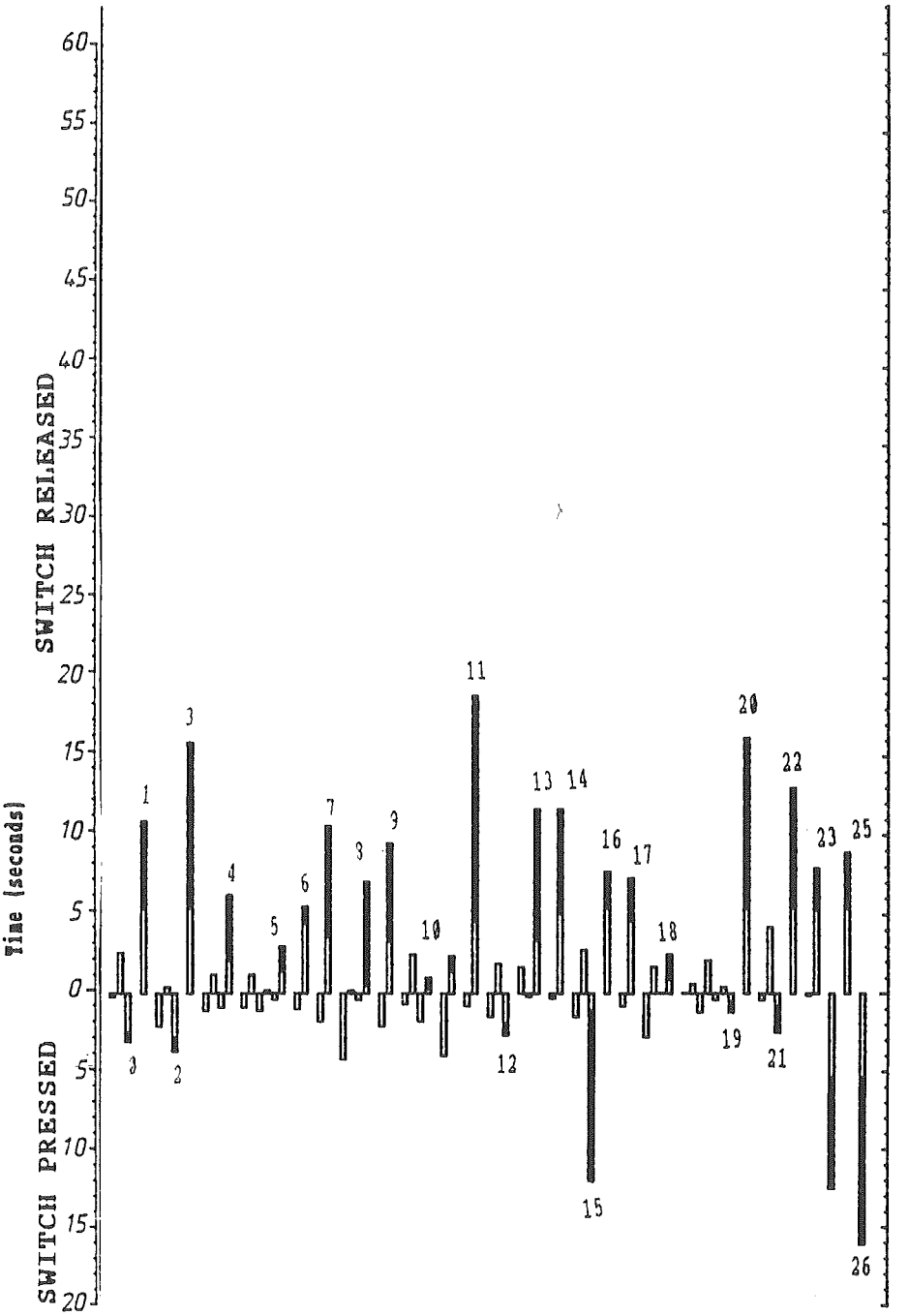


Batch 5

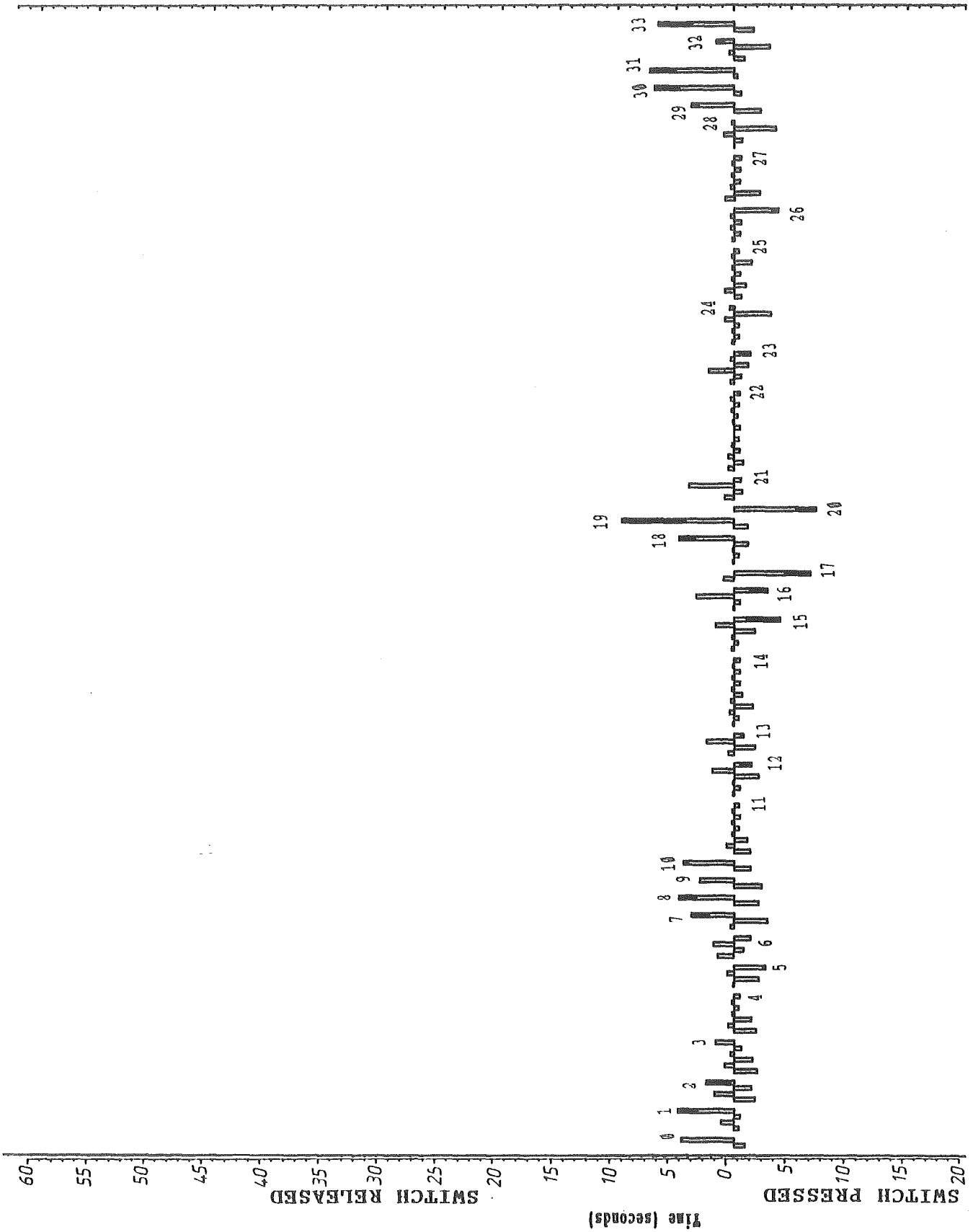

SWITCH RELEASED
SWITCH PRESSED
Time (seconds)
60
55
50
45
40
35
30
25
20
15
10
5
0
5
10
15
20
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

APPENDIX 26

Batch 6

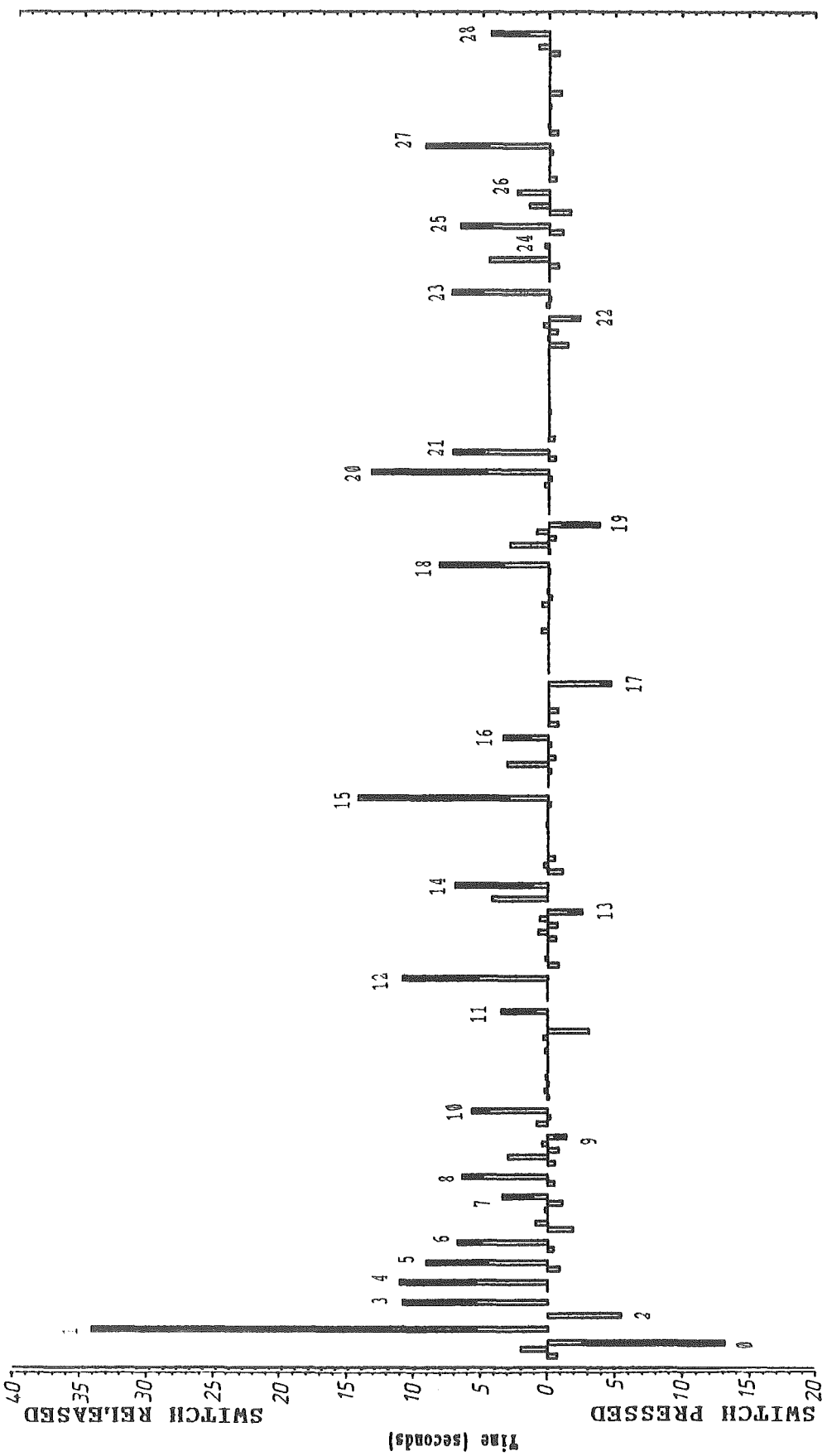


Batch 7

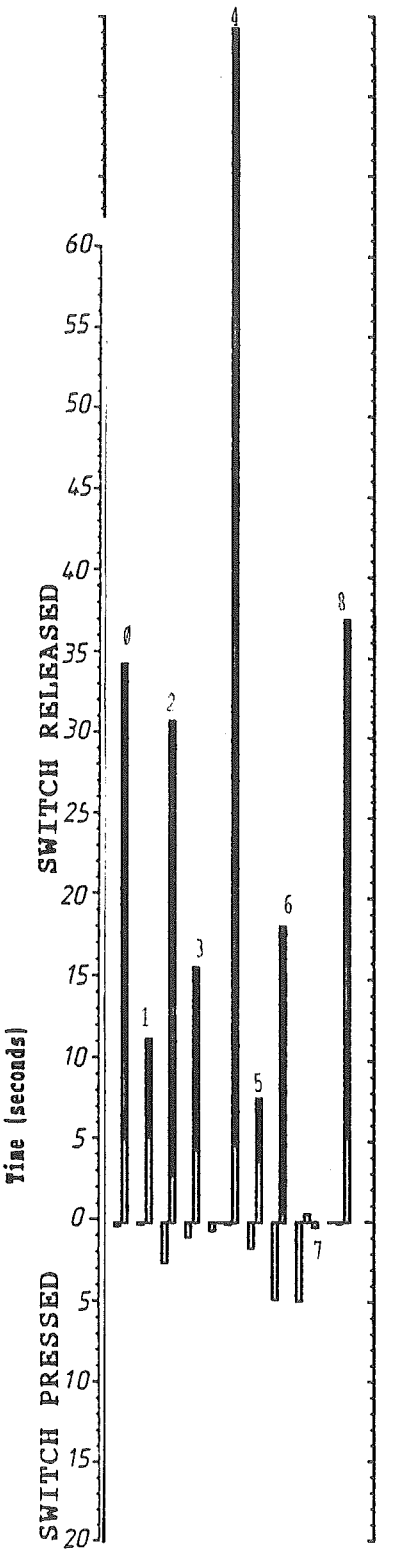

SWITCH PRESSED
SWITCH RELEASED
Time (seconds)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
0 5 10 15 20
60 55 50 45 40 35 30 25 20 15 10 5 0

APPENDIX 28

Batch 8

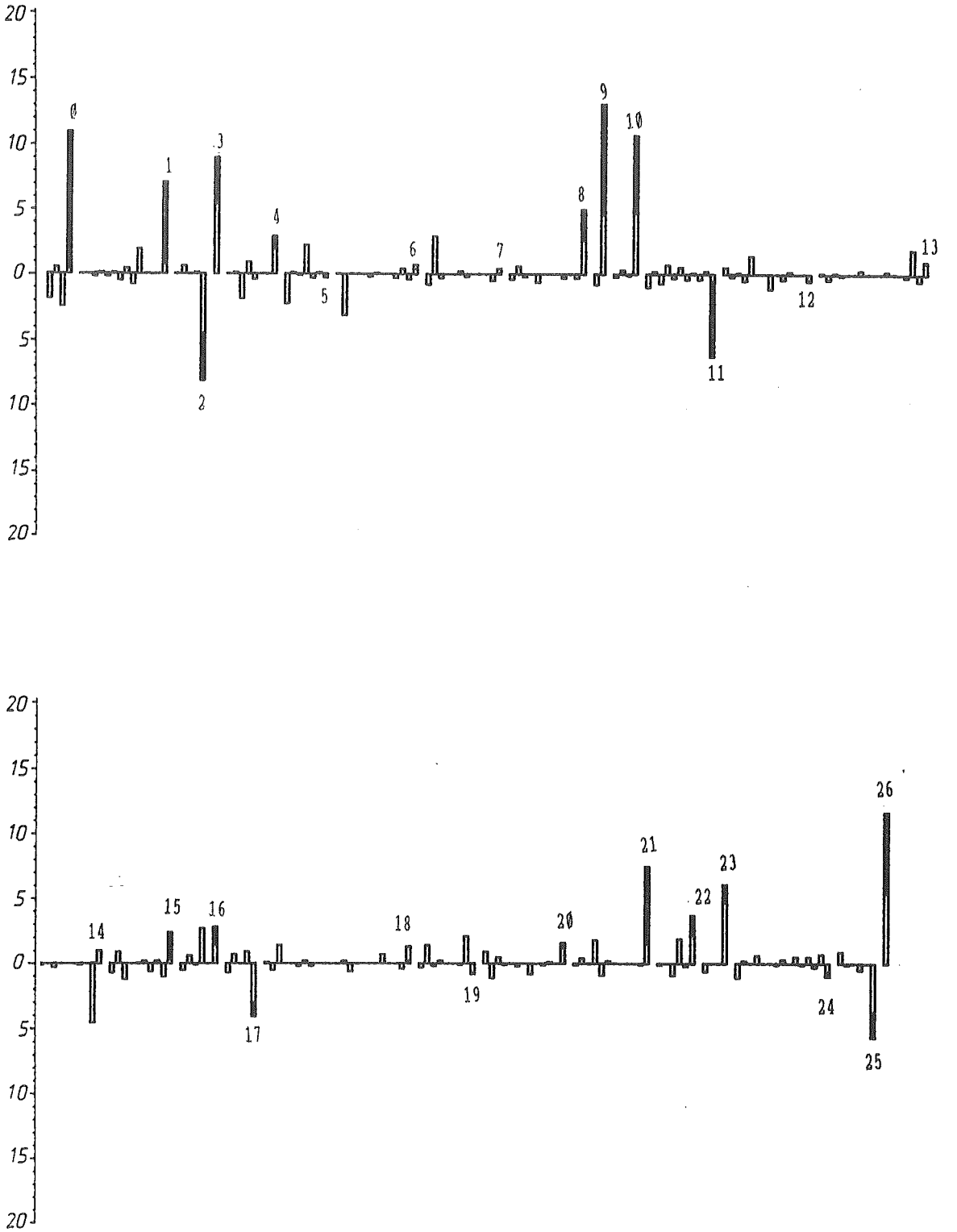


Batch 9

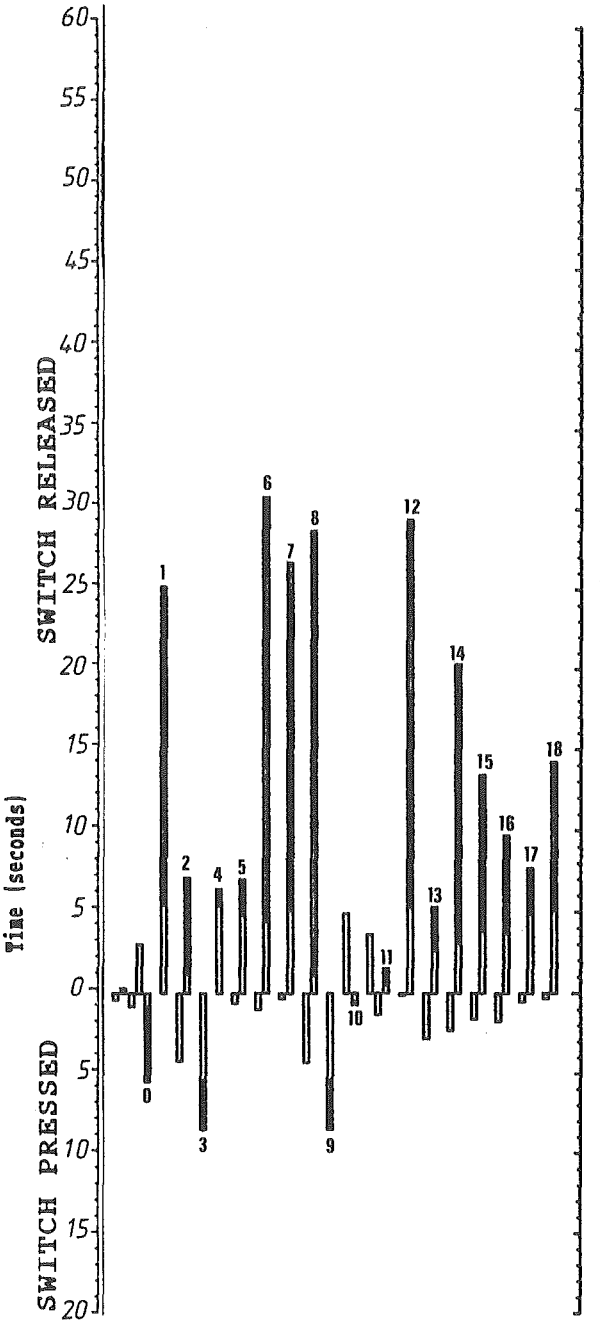

SWITCH RELEASED
SWITCH PRESSED
Time (seconds)
60
55
50
45
40
35
30
25
20
15
10
5
0
5
10
15
20
0
1
2
3
4
5
6
7
8

APPENDIX 30

Batch 10



Batch 11


SWITCH RELEASED
SWITCH PRESSED
Time (seconds)
60
55
50
45
40
35
30
25
20
15
10
5
0
5
10
15
20
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

APPENDIX 32

Batch 12

APPENDIX FOUR

FEATURE BY PERIOD TABLES FROM CASE STUDY ONE

Batch 1

```
:01234567890123456789 01:----------------------------------
:********** ** **** *:UP
:           *  *    **:DN
:           *  *      :ALT?
:          * ** *     :ADD
:          ******     :ALT1
:                     :ALT
:                     :UNAMBIGUOUS
:                     :OPTIMAL.ALT
:                     :SIMPLE.ALT
:                     :FAST.ALT
:                     :SLOW.ALT
:                     :*ALT
:01234567890123456789 01:----------------------------------
:********** *  **** *:RELEASE          Often       Runs
:********** *  ****  :ENDS_UP          Often       Clusters
:*** ******* *  ***   :SIMPLE.P/R      Often       Runs
:*** **** ** *   *    :PAUSED          Sometimes   Runs
:*** **** ** *   *    :OPTIMAL.P/R     Sometimes   Runs
:******** ** *   **  *:FEW.P/R         Often       Runs
: *      **     * **  *:FAST.P/R        Sometimes   Runs
:* ******  * *   *     :SLOW.P/R        Sometimes   Runs
:********** *  ****   :*P/R
:01234567890123456789 01:----------------------------------
:           *  *    *  :HOLD           Infrequent  Runs
:           *  *    *  :ENDS_DN        Always      Runs
:                  *  :SIMPLE.HOLD    Sometimes   Isolated
:                  *  :PAUSED.DN      Sometimes   Isolated
:                  *  :OPTIMAL.HOLD   Sometimes   Isolated
:           *  *    *  :FEW.HOLD       Always      Runs
:           *       *  :FAST.HOLD      Sometimes   Runs
:              *       :SLOW.HOLD      Sometimes   Isolated
:           *  *    *  :*HOLD
:01234567890123456789 01:----------------------------------
:         *      **   * :RUN            Infrequent  Runs
:                      :NO_TAIL        Never       None
:         *      **     :QUICK_DN       Sometimes   Runs
:                     * :QUICK_UP      Sometimes   Isolated
:         *      **   * :*RUN
:01234567890123456789 01:----------------------------------
:                      :ALT  Never     None        Absent
:********** *  ****  *:P/R  Often     Runs        Major
:           *  *    *  :HLD  Infrequent Runs      Minor
:         *      **   * :RUN  Infrequent Runs      Minor    (poor)
:              *       :UNCLAIMED
```

Batch 2

```
:012345678901234567890123:-----------------------------------
: ****  *   ****** *  ****:UP
:*    ** ***      *       :DN
:       *                 :ALT?
:      * *                :ADD
:      ***                :ALT1
:                         :ALT
:                         :UNAMBIGUOUS
:                         :OPTIMAL.ALT
:                         :SIMPLE.ALT
:                         :FAST.ALT
:                         :SLOW.ALT
:                         :*ALT
:012345678901234567890123:-----------------------------------
: ***        ****** *  ****:RELEASE          Sometimes  Clusters
: ***         ***** *  ****:ENDS_UP          Often      Clusters
: ***         *** *    ****:SIMPLE.P/R       Often      Clusters
:  **          ** *     ** :PAUSED           Sometimes  Runs
:  **        * ** *     ** :OPTIMAL.P/R      Sometimes  Runs
: ***        ****** *   ***:FEW.P/R          Often      Clusters
:            *****  *    * :FAST.P/R         Sometimes  Clusters
: ***             *    ** *:SLOW.P/R         Sometimes  Clusters
: ***         *** *     ***:*P/R
:012345678901234567890123:-----------------------------------
:*    ** ***      *       :HOLD               Infrequent Clusters
:*    **   *              :ENDS_DN            Sometimes  Runs
:*    **   *      *       :SIMPLE.HOLD        Sometimes  Runs
:*     *   *      *       :PAUSED.DN          Sometimes  Runs
:*     *          *       :OPTIMAL.HOLD       Sometimes  Runs
:*     *  **      *       :FEW.HOLD           Sometimes  Runs
:     *  ***              :FAST.HOLD          Sometimes  Clusters
:*     *          *       :SLOW.HOLD          Sometimes  Runs
:*    ** ***      *       :*HOLD
:012345678901234567890123:-----------------------------------
:    *  **           ***   :RUN                Infrequent Clusters
:       *            **    :NO_TAIL            Sometimes  Runs
:    *  *            ***   :QUICK_DN          Often      Runs
:       *             *    :QUICK_UP          Sometimes  Runs
:    *  **           ***   :*RUN
:012345678901234567890123:-----------------------------------
:                         :ALT  Never       None       Absent
: ***        ****** *  ****:P/R  Sometimes  Clusters   Notable
:*    **  **              :HLD  Infrequent  Clusters   Minor
:    *  **           ***   :RUN  Infrequent  Clusters   Minor
:                  *      :UNCLAIMED
```

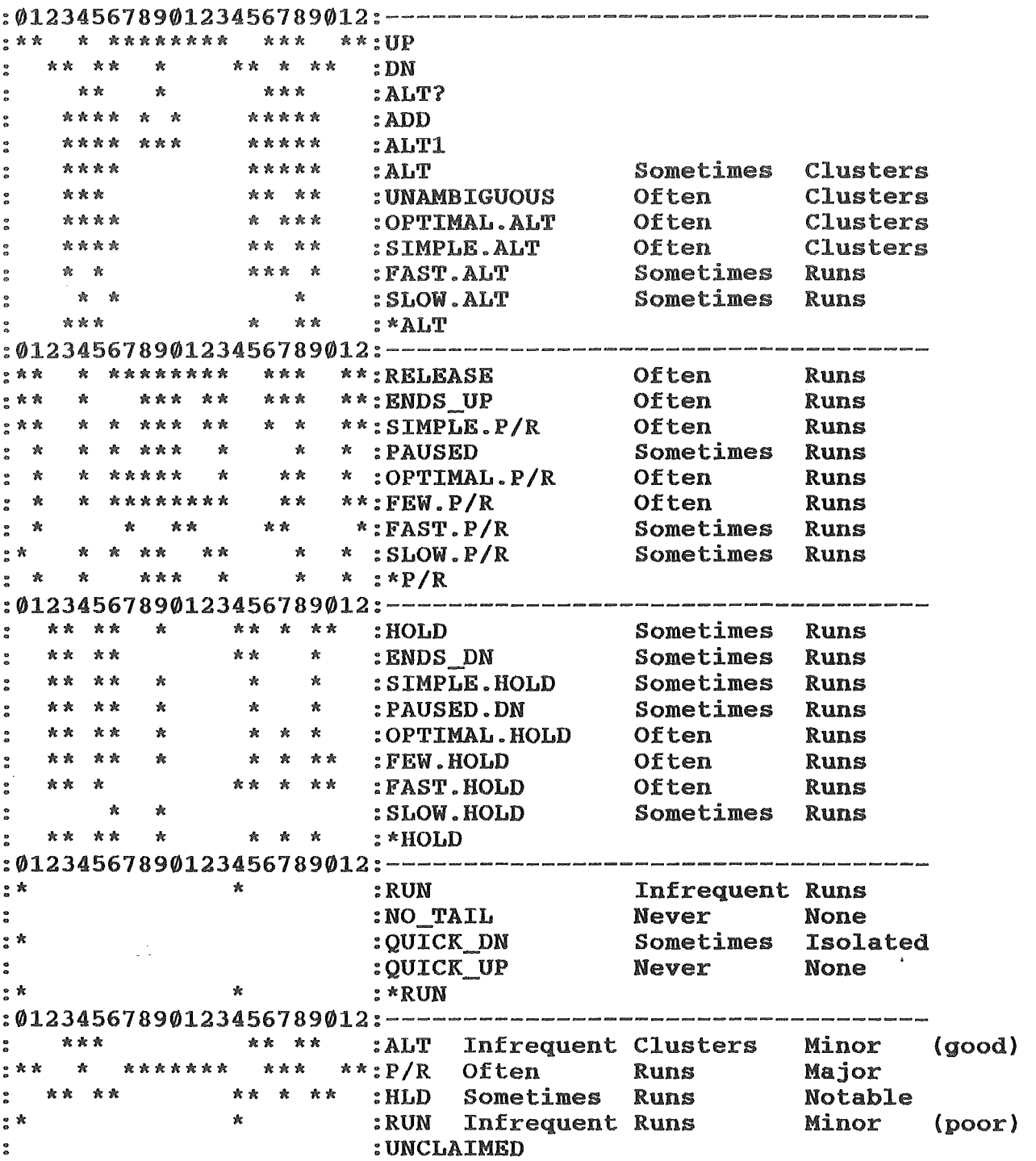
Batch 3

```
:01234567890123456789Ø1:-----------------------------------
:**  ****************   :UP
:  *                  **:DN
:  *                    :ALT?
: * *                   :ADD
: ***                   :ALT1
:                       :ALT
:                       :UNAMBIGUOUS
:                       :OPTIMAL.ALT
:                       :SIMPLE.ALT
:                       :FAST.ALT
:                       :SLOW.ALT
:                       :*ALT
:01234567890123456789Ø1:-----------------------------------
:**  *****  ***********   :RELEASE          Often       Runs
:**  *****  ***********   :ENDS_UP          Always      Runs
:**  ****   ***********   :SIMPLE.P/R       Often       Clusters
:**  ****   * *********   :PAUSED           Often       Runs
:**  ****   * ***     **  :OPTIMAL.P/R      Often       Runs
:**  *****  * ****  * **  :FEW.P/R          Often       Runs
: *         * * **   * *  :FAST.P/R         Sometimes   Runs
:*   *****   * *   ** *   :SLOW.P/R         Sometimes   Runs
:**  *****  ***********   :*P/R
:01234567890123456789Ø1:-----------------------------------
:  *                  **:HOLD               Infrequent  Clusters
:  *                   *:ENDS_DN            Sometimes   Runs
:  *                   *:SIMPLE.HOLD        Sometimes   Runs
:  *                   *:PAUSED.DN          Sometimes   Runs
:  *                   *:OPTIMAL.HOLD       Sometimes   Runs
:  *                   *:FEW.HOLD           Sometimes   Runs
:                      **:FAST.HOLD          Sometimes   Clusters
:  *                    :SLOW.HOLD          Sometimes   Isolated
:  *                  **:*HOLD
:01234567890123456789Ø1:-----------------------------------
:           *     * *  * :RUN                Infrequent  Runs
:                    * :NO_TAIL            Sometimes   Isolated
:           *     * *    :QUICK_DN           Sometimes   Runs
:                    * :QUICK_UP           Sometimes   Isolated
:           *     * *  * :*RUN
:01234567890123456789Ø1:-----------------------------------
:                      :ALT  Never       None        Absent
:**  *****  ***********  :P/R  Often       Runs        Major    (good)
:  *                   *:HLD  Infrequent  Runs        Minor    (good)
:           *          * :RUN  Infrequent  Runs        Minor
:         *              :UNCLAIMED
```

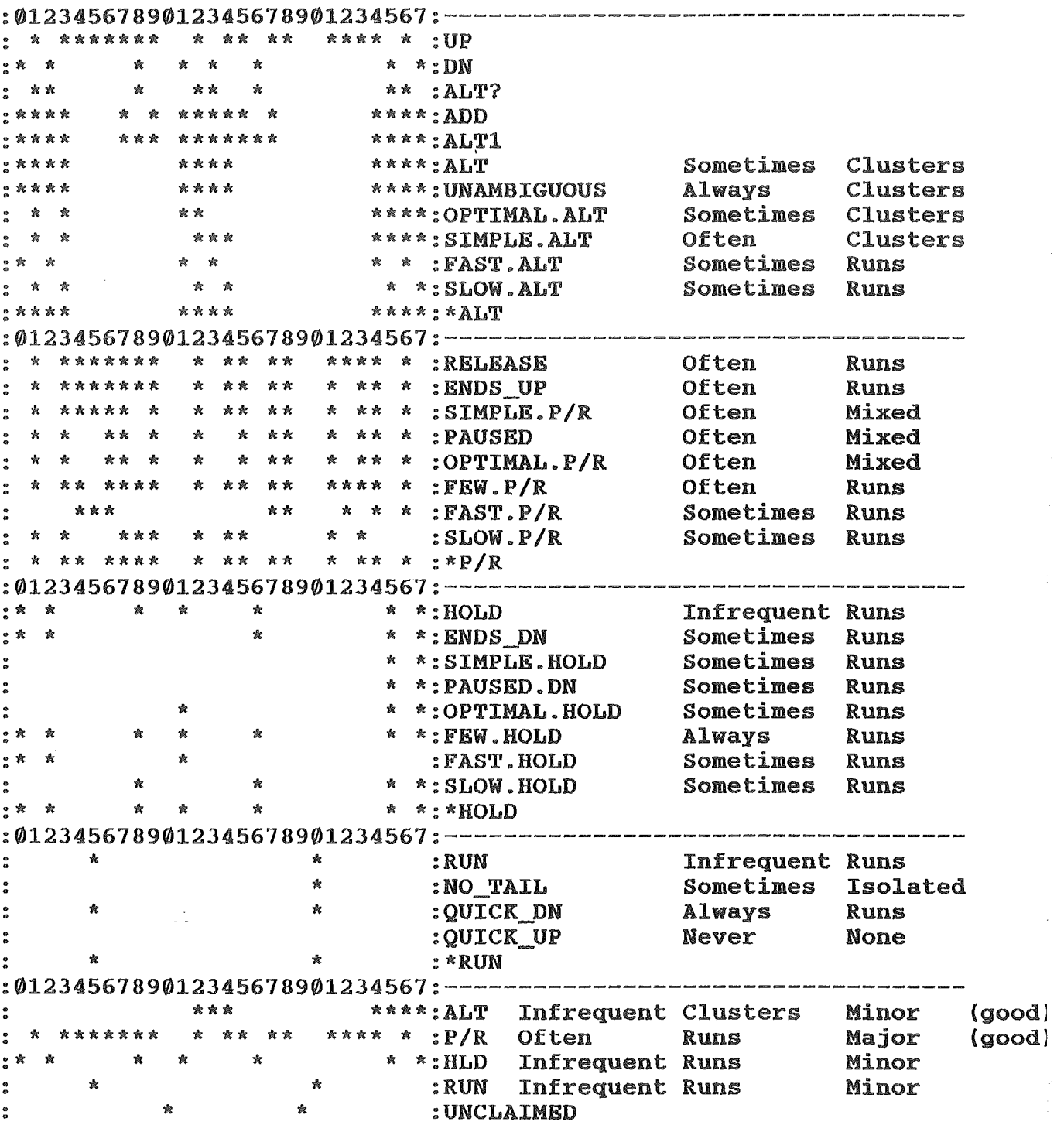
Batch 4

```
:0123456789012345:-----------------------------------------
:*****************:UP
:                 :DN
:                 :ALT?
:                 :ADD
:                 :ALT1
:                 :ALT
:                 :UNAMBIGUOUS
:                 :OPTIMAL.ALT
:                 :SIMPLE.ALT
:                 :FAST.ALT
:                 :SLOW.ALT
:                 :*ALT
:0123456789012345:-----------------------------------------
:*****************:RELEASE          Always      Block
:*****************:ENDS_UP          Always      Block
:******** *******:SIMPLE.P/R       Often       Block
:** *** * *******:PAUSED           Often       Runs
: * *    * ***    :OPTIMAL.P/R     Sometimes   Runs
:** * * * ***   *:FEW.P/R         Sometimes   Runs
:   *    **      *:FAST.P/R        Infrequent  Runs
:*** ***  ****** :SLOW.P/R        Often       Runs
:*****************:*P/R
:0123456789012345:-----------------------------------------
:                 :HOLD
:                 :ENDS_DN
:                 :SIMPLE.HOLD
:                 :PAUSED.DN
:                 :OPTIMAL.HOLD
:                 :FEW.HOLD
:                 :FAST.HOLD
:                 :SLOW.HOLD
:                 :*HOLD
:0123456789012345:-----------------------------------------
:  * * * *   *** :RUN              Sometimes   Runs
:                 :NO_TAIL         Never       None
:  * * *     *** :QUICK_DN        Often       Runs
:                 :QUICK_UP        Never       None
:  * * *     *** :*RUN
:0123456789012345:-----------------------------------------
:                 :ALT  Never      None        Absent
:*****************:P/R  Always     Block       Major    (good)
:                 :HLD  Never      None        Absent
:  *   * *       :RUN  Infrequent Runs        Notable  (poor)
:                 :UNCLAIMED
```

Batch 5


:01234567890123456789012:----------
:** * ******** *** **:UP
: ** ** * ** * ** :DN
: ** * *** :ALT?
: **** * * ***** :ADD
: **** *** ***** :ALT1
: **** ***** :ALT Sometimes Clusters
: *** ** ** :UNAMBIGUOUS Often Clusters
: **** * *** :OPTIMAL.ALT Often Clusters
: **** ** ** :SIMPLE.ALT Often Clusters
: * * *** * :FAST.ALT Sometimes Runs
: * * * :SLOW.ALT Sometimes Runs
: *** * ** :*ALT
:01234567890123456789012:----------
:** * ******** *** **:RELEASE Often Runs
:** * *** ** *** **:ENDS_UP Often Runs
:** * * *** ** * * **:SIMPLE.P/R Often Runs
: * * * *** * * * :PAUSED Sometimes Runs
: * * ***** * ** * :OPTIMAL.P/R Often Runs
: * * ******** ** **:FEW.P/R Often Runs
: * * ** ** *:FAST.P/R Sometimes Runs
:* * * ** ** * * :SLOW.P/R Sometimes Runs
: * * *** * * * :*P/R
:01234567890123456789012:----------
: ** ** * ** * ** :HOLD Sometimes Runs
: ** ** ** * :ENDS_DN Sometimes Runs
: ** ** * * * :SIMPLE.HOLD Sometimes Runs
: ** ** * * * :PAUSED.DN Sometimes Runs
: ** ** * * * * :OPTIMAL.HOLD Often Runs
: ** ** * * * ** :FEW.HOLD Often Runs
: ** * ** * ** :FAST.HOLD Often Runs
: * * :SLOW.HOLD Sometimes Runs
: ** ** * * * * :*HOLD
:01234567890123456789012:----------
:* * :RUN Infrequent Runs
: :NO_TAIL Never None
:* :QUICK_DN Sometimes Isolated
: :QUICK_UP Never None
:* * :*RUN
:01234567890123456789012:----------
: *** ** ** :ALT Infrequent Clusters Minor (good)
:** * ******* *** **:P/R Often Runs Major
: ** ** ** * ** :HLD Sometimes Runs Notable
:* * :RUN Infrequent Runs Minor (poor)
: :UNCLAIMED

Batch 6


:01234567890123456789012345678:
:UP
:DN
:ALT?
:ADD
:ALT1
:ALT Sometimes Clusters
:UNAMBIGUOUS Always Clusters
:OPTIMAL.ALT Sometimes Clusters
:SIMPLE.ALT Often Clusters
:FAST.ALT Sometimes Runs
:SLOW.ALT Sometimes Runs
:*ALT
:RELEASE Often Runs
:ENDS_UP Often Runs
:SIMPLE.P/R Often Mixed
:PAUSED Often Mixed
:OPTIMAL.P/R Often Mixed
:FEW.P/R Often Runs
:FAST.P/R Sometimes Runs
:SLOW.P/R Sometimes Runs
:*P/R
:HOLD Infrequent Runs
:ENDS_DN Sometimes Runs
:SIMPLE.HOLD Sometimes Runs
:PAUSED.DN Sometimes Runs
:OPTIMAL.HOLD Sometimes Runs
:FEW.HOLD Always Runs
:FAST.HOLD Sometimes Runs
:SLOW.HOLD Sometimes Runs
:*HOLD
:RUN Infrequent Runs
:NO_TAIL Sometimes Isolated
:QUICK_DN Always Runs
:QUICK_UP Never None
:*RUN
:ALT Infrequent Clusters Minor (good)
:P/R Often Runs Major (good)
:HLD Infrequent Runs Minor
:RUN Infrequent Runs Minor
:UNCLAIMED

Batch 7

```
:01234567890123456789012345678901234:-----------------------------------
:***    ****     * ** *       *** *:UP
:     *         * *  *   * * *   * :DN
:                **  *           * :ALT?
:               ***** *         * *:ADD
:               *******         ***:ALT1
:               ****              :ALT            Infrequent Clusters
:               ****              :UNAMBIGUOUS    Always     Clusters
:                 *               :OPTIMAL.ALT    Sometimes  Isolated
:               * **              :SIMPLE.ALT     Sometimes  Runs
:               ****              :FAST.ALT       Always     Clusters
:                                 :SLOW.ALT       Never      None
:               ****              :*ALT
:01234567890123456789012345678901234:-----------------------------------
:**     ****     * ** *       *** *:RELEASE        Sometimes  Clusters
:**     ****       **         *** *:ENDS_UP        Often      Clusters
:**      ***       **         *** *:SIMPLE.P/R     Often      Clusters
:*       ***        *         *** *:PAUSED         Sometimes  Clusters
:*       ***        *         *** *:OPTIMAL.P/R    Sometimes  Clusters
:**     ****     *  * *       *** *:FEW.P/R        Often      Clusters
:**     ****     * *  *       *** *:FAST.P/R       Often      Clusters
:                  *               :SLOW.P/R       Infrequent Isolated
:**      ***       *         *** *:*P/R
:01234567890123456789012345678901234:-----------------------------------
:               * *  *   * * *   * :HOLD           Infrequent Mixed
:               * *  *     *       :ENDS_DN        Sometimes  Runs
:               * *  *     *       :SIMPLE.HOLD    Sometimes  Runs
:                 *  *             :PAUSED.DN      Sometimes  Runs
:                 *  *             :OPTIMAL.HOLD   Sometimes  Runs
:                 *  *           * :FEW.HOLD       Sometimes  Runs
:               * *  *   * * *   * :FAST.HOLD      Always     Mixed
:                                   :SLOW.HOLD      Never      None
:               * *  *   * * *   * :*HOLD
:01234567890123456789012345678901234:-----------------------------------
:   **      ** **      ******       :RUN            Sometimes  Clusters
:   **      ** *       **** *       :NO_TAIL        Often      Clusters
:    *       *  *       ** *        :QUICK_DN       Sometimes  Runs
:   **      ** **      * ****       :QUICK_UP       Often      Clusters
:   **      ** *       * ** *       :*RUN
:01234567890123456789012345678901234:-----------------------------------
:                 **                :ALT  Infrequent Clusters   Minor    (good)
:**     ****     * ** *       *** *:P/R  Sometimes  Clusters   Notable
:               * *  *     * *   * :HLD  Infrequent Runs       Minor
:   **      ** **      ******       :RUN  Sometimes  Clusters   Notable  (good)
:  *  **       *                    :UNCLAIMED
```

Batch 8

```
:01234567890123456789012345678:----------------------------------------
: * ********** *** * ** ******:UP
:* *         * *   * *  *     :DN
: **         ***   ***  *     :ALT?
:****       ***** ****** *    :ADD
:****       ***** ********    :ALT1
:****       ***** *****       :ALT          Sometimes  Clusters
:****       * *** *****       :UNAMBIGUOUS  Often      Clusters
: ***                         :OPTIMAL.ALT  Infrequent Clusters
: ***       * **   ** *       :SIMPLE.ALT   Sometimes  Runs
:  *        ** *  ****        :FAST.ALT     Sometimes  Clusters
:** *         * *     *       :SLOW.ALT     Sometimes  Runs
:****       * *** *****       :*ALT
:01234567890123456789012345678:----------------------------------------
: * ********** *** * ** *** **:RELEASE      Often      Runs
: * ****** *** *** * ** * * **:ENDS_UP      Often      Mixed
: * ****** * *  *  * ** * * **:SIMPLE.P/R   Often      Mixed
: * **** * * *       ** * * * :PAUSED       Sometimes  Runs
: * **** *             *   *   :OPTIMAL.P/R  Sometimes  Runs
: * **** * * * *      * * *   :FEW.P/R      Sometimes  Mixed
:     *******    * *  * *** **:FAST.P/R     Often      Runs
: * **       * **    *        :SLOW.P/R     Sometimes  Runs
: * ********** *** * ** *** **:*P/R
:01234567890123456789012345678:----------------------------------------
:* *         *     * *         :HOLD         Infrequent Runs
:* *               * *         :ENDS_DN      Often      Runs
:  *              *           :SIMPLE.HOLD  Sometimes  Runs
:  *                          :PAUSED.DN    Sometimes  Isolated
:  *                          :OPTIMAL.HOLD Sometimes  Isolated
:* *                          :FEW.HOLD     Sometimes  Runs
:  *         *     * *         :FAST.HOLD    Often      Runs
:*                            :SLOW.HOLD    Sometimes  Isolated
:* *         *     * *         :*HOLD
:01234567890123456789012345678:----------------------------------------
:       *   * * **** * * *  **:RUN          Sometimes  Runs
:                       *    :NO_TAIL      Infrequent Isolated
:       *       ** * *   *  **:QUICK_DN     Sometimes  Runs
:             *   *    *      :QUICK_UP     Sometimes  Runs
:       *   * * **** * * *  **:*RUN
:01234567890123456789012345678:----------------------------------------
: ***        **   **           :ALT  Infrequent Clusters   Minor   (good)
: * ********** *** * ** * * **:P/R  Often      Mixed      Major
:* *         *     * *         :HLD  Infrequent Runs       Minor
:       *   * * ****   * *   *:RUN  Sometimes  Runs       Notable (poor)
:                         *    :UNCLAIMED
```

Batch 9

```
:Ø12345678:-----------------------------------
:******* *:UP
:       ** :DN
:        * :ALT?
:       * *:ADD
:       ***:ALT1
:          :ALT
:          :UNAMBIGUOUS
:          :OPTIMAL.ALT
:          :SIMPLE.ALT
:          :FAST.ALT
:          :SLOW.ALT
:          :*ALT
:Ø12345678:-----------------------------------
:******* *:RELEASE          Often       Block
:******* *:ENDS_UP          Always      Block
:******* *:SIMPLE.P/R       Always      Block
:******* *:PAUSED           Always      Block
:**** **  :OPTIMAL.P/R      Often       Runs
:******* *:FEW.P/R          Always      Block
:      *  :FAST.P/R         Infrequent  Isolated
:***** * *:SLOW.P/R         Often       Runs
:******* *:*P/R
:Ø12345678:-----------------------------------
:       ** :HOLD            Sometimes   Runs
:          :ENDS_DN         Never       None
:       *  :SIMPLE.HOLD     Sometimes   Isolated
:       *  :PAUSED.DN       Sometimes   Isolated
:       *  :OPTIMAL.HOLD    Sometimes   Isolated
:       ** :FEW.HOLD        Always      Runs
:        * :FAST.HOLD       Sometimes   Isolated
:       *  :SLOW.HOLD       Sometimes   Isolated
:       ** :*HOLD
:Ø12345678:-----------------------------------
:          :RUN
:          :NO_TAIL
:          :QUICK_DN
:          :QUICK_UP
:          :*RUN
:Ø12345678:-----------------------------------
:          :ALT  Never       None        Absent
:******* *:P/R  Often       Block       Major     (good)
:        * :HLD  Infrequent  Isolated    Notable   (poor)
:          :RUN  Never       None        Absent
:          :UNCLAIMED
```

Batch 10

```
:01234567890123456789012345678:-------------------------------------
:**  **    ***     **    ****   *:UP
:  *   *     *   *   *         * :DN
:  *                             :ALT?
: * *                            :ADD
: ***                            :ALT1
:                                :ALT
:                                :UNAMBIGUOUS
:                                :OPTIMAL.ALT
:                                :SIMPLE.ALT
:                                :FAST.ALT
:                                :SLOW.ALT
:                                :*ALT
:01234567890123456789012345678:-------------------------------------
:**  *     ***             ***   *:RELEASE          Sometimes  Clusters
:**  *     ***             ***   *:ENDS_UP          Always     Clusters
: *  *     ***             ***   *:SIMPLE.P/R       Often      Runs
:    *      **               *   *:PAUSED           Sometimes  Runs
:    *      *                    *:OPTIMAL.P/R      Sometimes  Runs
:*   *      **               *   *:FEW.P/R          Sometimes  Runs
:    *     *                 **   :FAST.P/R         Sometimes  Runs
:**         **             *     *:SLOW.P/R         Sometimes  Clusters
:**  *     ***             ***   *:*P/R
:01234567890123456789012345678:-------------------------------------
:  *    *     *   *   *         * :HOLD             Infrequent Runs
:  *          *       *         * :ENDS_DN          Sometimes  Runs
:  *          *       *         * :SIMPLE.HOLD      Sometimes  Runs
:  *                             :PAUSED.DN         Sometimes  Isolated
:                                :OPTIMAL.HOLD      Never      None
:                                :FEW.HOLD          Never      None
:  *    *         *   *         * :FAST.HOLD        Often      Runs
:              *                 :SLOW.HOLD         Sometimes  Isolated
:  *    *     *   *   *         * :*HOLD
:01234567890123456789012345678:-------------------------------------
: *   *****  ****** ***** **  :RUN                Often      Runs
:      ***     ***    **     *  :NO_TAIL           Sometimes  Clusters
: *   *  **    ** ** ***** *  :QUICK_DN          Often      Runs
:       *     ****    * *    ** :QUICK_UP         Sometimes  Runs
: *   *  **    ** ** ***** *  :*RUN
:01234567890123456789012345678:-------------------------------------
:                                :ALT  Never      None       Absent
:**  *     ***             ***   *:P/R  Sometimes  Clusters   Notable
:  *          *       *         * :HLD  Infrequent Runs       Minor
: *   *****  ****** ***** **  :RUN  Often      Runs       Major
:                                :UNCLAIMED
```

Batch 11

```
:0123456789012345678:-------------------------------------
:*** ***** *********:UP
:* **     **        :DN
: * *      *        :ALT?
:* * *    * *       :ADD
:*****    ***       :ALT1
:                   :ALT
:                   :UNAMBIGUOUS
:                   :OPTIMAL.ALT
:                   :SIMPLE.ALT
:                   :FAST.ALT
:                   :SLOW.ALT
:                   :*ALT
:0123456789012345678:-------------------------------------
:*** ***** *********:RELEASE          Often       Runs
: ** *****   *******:ENDS_UP          Often       Runs
: ** *****   *******:SIMPLE.P/R       Often       Runs
: ** *****   *******:PAUSED           Often       Runs
: ** ***** * *******:OPTIMAL.P/R      Often       Runs
: ** ***** *********:FEW.P/R          Often       Runs
:*   **     ** *   * :FAST.P/R        Sometimes   Runs
: **   ***   * *** *:SLOW.P/R        Sometimes   Runs
: ** *****   *******:*P/R
:0123456789012345678:-------------------------------------
:* **     **        :HOLD             Infrequent  Runs
:*  *      *        :ENDS_DN          Sometimes   Runs
:  **     **        :SIMPLE.HOLD      Often       Runs
:  **     **        :PAUSED.DN        Often       Runs
:  **     **        :OPTIMAL.HOLD     Often       Runs
:  **     **        :FEW.HOLD         Often       Runs
:*  *      *        :FAST.HOLD        Sometimes   Runs
:  *      *        :SLOW.HOLD        Sometimes   Runs
:* **     **        :*HOLD
:0123456789012345678:-------------------------------------
:                   :RUN
:                   :NO_TAIL
:                   :QUICK_DN
:                   :QUICK_UP
:                   :*RUN
:0123456789012345678:-------------------------------------
:                   :ALT  Never       None        Absent
:*** ***** *********:P/R  Often       Runs        Major    (good)
:*  *      *        :HLD  Infrequent  Runs        Minor
:                   :RUN  Never       None        Absent
:                   :UNCLAIMED
```

Batch 12

```
:01234567890123456789012345678:----------------------------------------
:******************************:UP
:                              :DN
:                              :ALT?
:                              :ADD
:                              :ALT1
:                              :ALT
:                              :UNAMBIGUOUS
:                              :OPTIMAL.ALT
:                              :SIMPLE.ALT
:                              :FAST.ALT
:                              :SLOW.ALT
:                              :*ALT
:01234567890123456789012345678:----------------------------------------
:************************ * **:RELEASE          Often       Runs
:****************** **** * **:ENDS_UP          Often       Runs
:******************   *** * **:SIMPLE.P/R      Often       Runs
:*****************    *** *  *:PAUSED          Often       Clusters
:** **   * **   **      ** *   :OPTIMAL.P/R     Sometimes   Runs
:***** ** *** ****    ** *    :FEW.P/R         Often       Runs
:     * * ***************   **:FAST.P/R         Often       Clusters
:**** * *                 *    :SLOW.P/R         Infrequent  Clusters
:*****************    *** *  *:*P/R
:01234567890123456789012345678:----------------------------------------
:                              :HOLD
:                              :ENDS_DN
:                              :SIMPLE.HOLD
:                              :PAUSED.DN
:                              :OPTIMAL.HOLD
:                              :FEW.HOLD
:                              :FAST.HOLD
:                              :SLOW.HOLD
:                              :*HOLD
:01234567890123456789012345678:----------------------------------------
:      *   *    *     ***   * ***:RUN             Sometimes   Runs
:                    *           :NO_TAIL         Infrequent  Isolated
:      *   *    *     ***   * ***:QUICK_DN        Always      Runs
:                                :QUICK_UP        Never       None
:      *   *    *     ***   * ***:*RUN
:01234567890123456789012345678:----------------------------------------
:                              :ALT  Never       None        Absent
:****************** **** * **:P/R  Often       Runs        Major    (good)
:                              :HLD  Never       None        Absent
:                    **    * ** :RUN  Infrequent Runs        Notable
:                              :UNCLAIMED
```

APPENDIX FIVE

FEATURE BY STRATEGY TABLES FROM CASE STUDY ONE

Batch 1

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major
 Major features    :Ends up Simple Few
 Notable features :Paused Optimal Fast Slow
 Minor features    :Presses
 Absent features   :none
HOLDING STRATEGY Minor
 Major features    :none
 Notable features :Simple Paused Optimal Fast Slow
 Minor features    :none
 Absent features   :none
RUNNING STRATEGY Minor    (poor)
 Major features    :none
 Notable features :Quick dn Quick up
 Minor features    :none
 Absent features   :No tail
```

Batch 2

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Notable
 Major features    :Ends up Simple Few
 Notable features :Paused Optimal Fast Slow
 Minor features    :none
 Absent features   :Presses
HOLDING STRATEGY Minor
 Major features    :none
 Notable features :Ends dn Simple Paused Optimal Few Fast Slow
 Minor features    :none
 Absent features   :none
RUNNING STRATEGY Minor
 Major features    :Quick dn
 Notable features :No tail Quick up
 Minor features    :none
 Absent features   :none
```

Batch 3

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major    (good)
 Major features    :Simple Paused Optimal Few
 Notable features :Fast Slow
 Minor features    :none
 Absent features   :Presses
HOLDING STRATEGY Minor    (good)
 Major features    :none
 Notable features :Ends dn Simple Paused Optimal Few Fast Slow
 Minor features    :none
 Absent features   :none
RUNNING STRATEGY Minor
 Major features    :none
 Notable features :No tail Quick dn Quick up
 Minor features    :none
 Absent features   :none
```

Batch 4

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major    (good)
 Major features    :Ends up Simple Paused Slow
 Notable features :Optimal Few
 Minor features    :Fast
 Absent features   :Presses
HOLDING STRATEGY Absent
RUNNING STRATEGY Notable (poor)
 Major features    :Quick dn
 Notable features :none
 Minor features    :none
 Absent features   :No tail Quick up
```

Batch 5

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Minor    (good)
 Major features    :Unambiguous Optimal Simple
 Notable features :Fast Slow
 Minor features    :none
 Absent features   :none
PRESS/RELEASE STRATEGY Major
 Major features    :Ends up Simple Optimal Few
 Notable features :Paused Fast Slow
 Minor features    :none
 Absent features   :Presses
HOLDING STRATEGY Notable
 Major features    :Optimal Few Fast
 Notable features :Ends dn Simple Paused Slow
 Minor features    :none
 Absent features   :none
RUNNING STRATEGY Minor    (poor)
 Major features    :none
 Notable features :Quick dn
 Minor features    :none
 Absent features   :No tail Quick up
```

Batch 6

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Minor    (good)
 Major features    :Simple
 Notable features :Optimal Fast Slow
 Minor features    :none
 Absent features   :none
PRESS/RELEASE STRATEGY Major    (good)
 Major features    :Ends up Simple Paused Optimal Few
 Notable features :Fast Slow
 Minor features    :none
 Absent features   :Presses
HOLDING STRATEGY Minor
 Major features    :none
 Notable features :Ends dn Simple Paused Optimal Fast Slow
 Minor features    :none
 Absent features   :none
RUNNING STRATEGY Minor
 Major features    :none
 Notable features :No tail
 Minor features    :none
 Absent features   :Quick up
```

Batch 7

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Minor    (good)
 Major features    :none
 Notable features :Optimal Simple
 Minor features    :none
 Absent features   :Slow
PRESS/RELEASE STRATEGY Notable
 Major features    :Ends up Simple Few Fast
 Notable features :Paused Optimal
 Minor features    :Slow
 Absent features   :Presses
HOLDING STRATEGY Minor
 Major features    :none
 Notable features :Ends dn Simple Paused Optimal Few
 Minor features    :none
 Absent features   :Slow
RUNNING STRATEGY Notable (good)
 Major features    :No tail Quick up
 Notable features :Quick dn
 Minor features    :none
 Absent features   :none
```

Batch 8

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY (good)
 Major features    :Unambiguous
 Notable features :Simple Fast Slow
 Minor features    :Optimal
 Absent features   :none
PRESS/RELEASE STRATEGY
 Major features    :Ends up Simple Fast
 Notable features :Paused Optimal Few Slow
 Minor features    :Presses
 Absent features   :none
HOLDING STRATEGY
 Major features    :Ends dn Fast
 Notable features :Simple Paused Optimal Few Slow
 Minor features    :none
 Absent features   :none
RUNNING STRATEGY (poor)
 Major features    :none
 Notable features :Quick dn Quick up
 Minor features    :No tail
 Absent features   :none
```

Batch 9

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major    (good)
 Major features    :Ends up Simple Paused Optimal Few Slow
 Notable features :none
 Minor features    :Fast
 Absent features   :Presses
HOLDING STRATEGY Notable (poor)
 Major features    :none
 Notable features :Simple Paused Optimal Fast Slow
 Minor features    :none
 Absent features   :Ends dn
RUNNING STRATEGY Absent
```

Batch 10

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Notable
 Major features    :Simple
 Notable features :Paused Optimal Few Fast Slow
 Minor features    :none
 Absent features   :Presses
HOLDING STRATEGY Minor
 Major features    :Fast
 Notable features :Ends dn Simple Paused Slow
 Minor features    :none
 Absent features   :Optimal Few
RUNNING STRATEGY Major
 Major features    :Quick dn
 Notable features :No tail Quick up
 Minor features    :none
 Absent features   :none
SUB-GROUP
01234567890123456789012345 6
 *   *****   ****** ***** ** :MAJOR GROUP
      ***     ***    **     *  :NO_TAIL
```

Batch 11

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major    (good)
 Major features    :Ends up Simple Paused Optimal Few
 Notable features :Fast Slow
 Minor features    :none
 Absent features   :Presses
HOLDING STRATEGY Minor
 Major features    :Simple Paused Optimal Few
 Notable features :Ends dn Fast Slow
 Minor features    :none
 Absent features   :none
RUNNING STRATEGY Absent
```

Batch 12

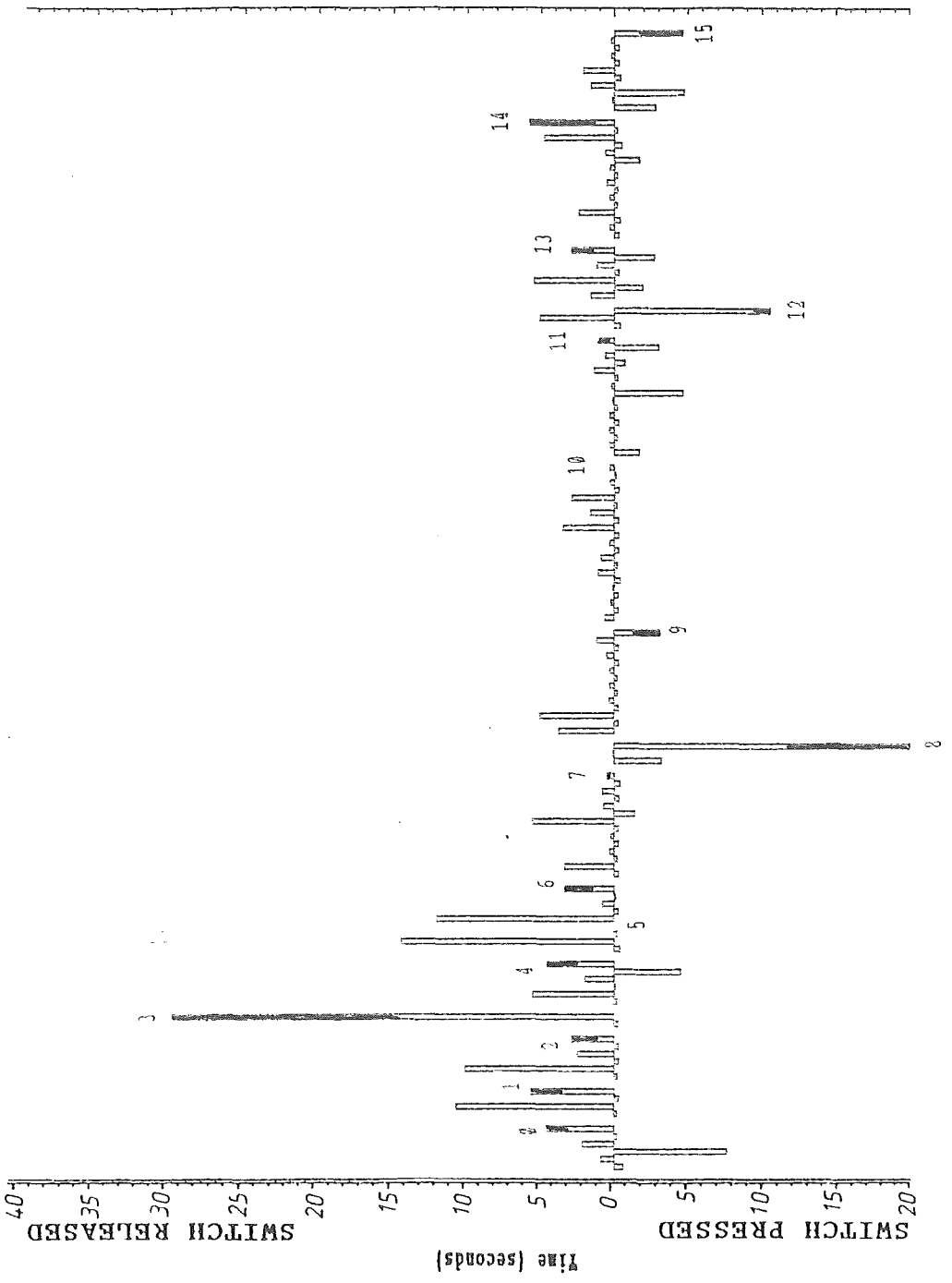
```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major    (good)
 Major features    :Ends up Simple Paused Few Fast
 Notable features :Optimal
 Minor features    :Slow
 Absent features   :Presses
HOLDING STRATEGY Absent
RUNNING STRATEGY Notable
 Major features    :none
 Notable features :none
 Minor features    :No tail
 Absent features   :Quick up
```

APPENDIX SIX

SELECT BATCHES FROM CASE STUDY TWO

APPENDIX 54

Batch 3



Batch 3

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major    (poor)
 Major features    :Fast
 Notable features :Ends up Few Presses
 Minor features    :Simple Paused Optimal Slow
 Absent features   :none
HOLDING STRATEGY Notable (poor)
 Major features    :Fast
 Notable features :Ends dn Few Slow
 Minor features    :none
 Absent features   :Simple Paused Optimal
RUNNING STRATEGY Minor
 Major features    :none
 Notable features :No tail Quick dn Quick up
 Minor features    :none
 Absent features   :none
```

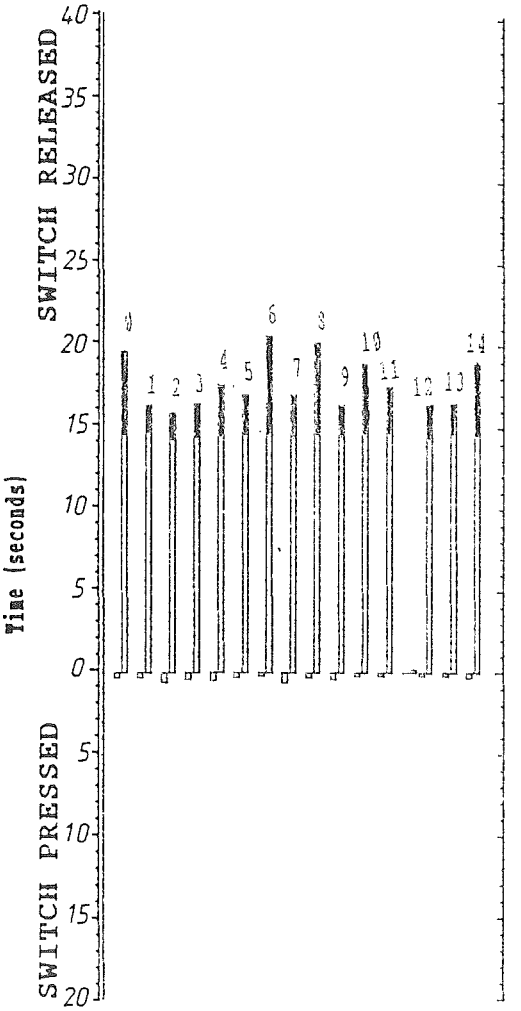
APPENDIX 56

Batch 3

```
:0123456789012345:-----------------------------------
:******** ** *** :UP
:*    *    ** **   *:DN
:     *    * **     :ALT?
:    * * * ****     :ADD
:    *** ******     :ALT1
:           ***     :ALT              Infrequent Clusters
:           **      :UNAMBIGUOUS      Sometimes  Runs
:                   :OPTIMAL.ALT      Never      None
:                   :SIMPLE.ALT       Never      None
:           ***     :FAST.ALT         Always     Clusters
:                   :SLOW.ALT         Never      None
:           ***     :*ALT
:0123456789012345:-----------------------------------
:******** ** *** :RELEASE          Often      Runs
:** ** *        * :ENDS_UP         Sometimes  Runs
:    *            :SIMPLE.P/R      Infrequent Isolated
:    *            :PAUSED          Infrequent Isolated
:    *            :OPTIMAL.P/R     Infrequent Isolated
: * * *       *    :FEW.P/R         Sometimes  Runs
:*** **** ** *** :FAST.P/R         Often      Runs
:    *            :SLOW.P/R        Infrequent Isolated
: *     **       * :PRESSES         Sometimes  Runs
:******** ** *** :*P/R
:0123456789012345:-----------------------------------
:*    *    ** **   *:HOLD           Sometimes  Runs
:         **   *   *:ENDS_DN        Sometimes  Runs
:                  :SIMPLE.HOLD     Never      None
:                  :PAUSED.DN       Never      None
:                  :OPTIMAL.HOLD    Never      None
:         *    *    :FEW.HOLD       Sometimes  Runs
:*    *     * **   *:FAST.HOLD      Often      Runs
:         *          :SLOW.HOLD      Sometimes  Isolated
:*    *    ** **   *:*HOLD
:0123456789012345:-----------------------------------
:           **   * :RUN            Infrequent Runs
:           **     :NO_TAIL        Sometimes  Runs
:           *    * :QUICK_DN       Sometimes  Runs
:             *    :QUICK_UP       Sometimes  Isolated
:           **   * :*RUN
:0123456789012345:-----------------------------------
:                  :ALT  Never      None       Absent
:******** *   *** :P/R  Often      Runs       Major    (poor)
:*    *    **   *  *:HLD  Sometimes  Runs       Notable  (poor)
:           **   * :RUN  Infrequent Runs       Minor
:                  :UNCLAIMED
```

Batch 6

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major    (good)
 Major features    :Ends up Simple Paused Optimal Few Fast
 Notable features  :none
 Minor features    :Slow
 Absent features   :Presses
HOLDING STRATEGY Absent
RUNNING STRATEGY Absent
```

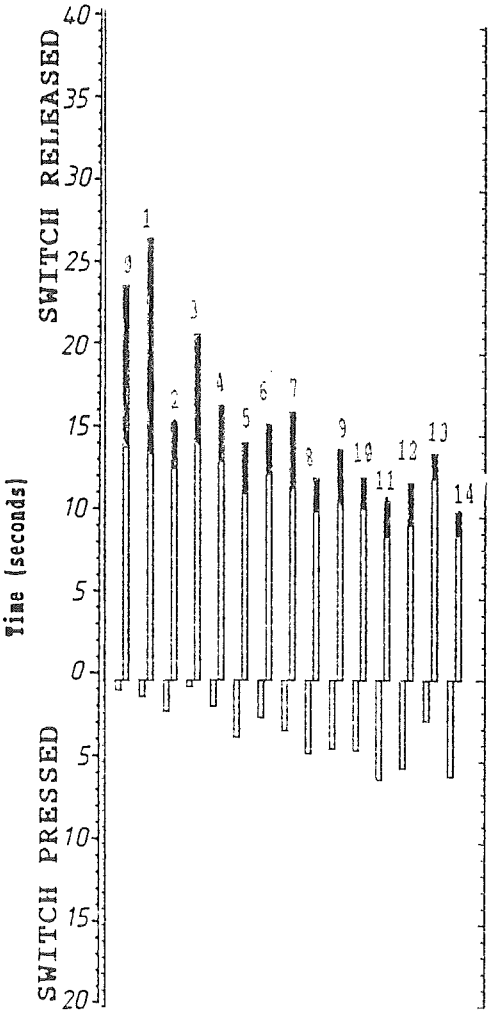


Batch 6

```
:0123456789012345:-----------------------------------
:****************:UP
:                :DN
:                :ALT?
:                :ADD
:                :ALT1
:                :ALT
:                :UNAMBIGUOUS
:                :OPTIMAL.ALT
:                :SIMPLE.ALT
:                :FAST.ALT
:                :SLOW.ALT
:                :*ALT
:0123456789012345:-----------------------------------
:****************:RELEASE          Always     Block
:****************:ENDS_UP          Always     Block
:****************:SIMPLE.P/R       Always     Block
:****************:PAUSED           Always     Block
:************ **:OPTIMAL.P/R       Often      Block
:****************:FEW.P/R          Always     Block
: ***** * ******:FAST.P/R          Often      Runs
:*      * *      :SLOW.P/R          Infrequent Runs
:                :PRESSES          Never      None
:****************:*P/R
:0123456789012345:-----------------------------------
:                :HOLD
:                :ENDS_DN
:                :SIMPLE.HOLD
:                :PAUSED.DN
:                :OPTIMAL.HOLD
:                :FEW.HOLD
:                :FAST.HOLD
:                :SLOW.HOLD
:                :*HOLD
:0123456789012345:-----------------------------------
:                :RUN
:                :NO_TAIL
:                :QUICK_DN
:                :QUICK_UP
:                :*RUN
:0123456789012345:-----------------------------------
:                :ALT  Never       None       Absent
:****************:P/R  Always      Block      Major    (good)
:                :HLD  Never       None       Absent
:                :RUN  Never       None       Absent
:                :UNCLAIMED
```

Batch 14

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major    (good)
 Major features    :Ends up Simple Paused Optimal Few Fast
 Notable features :none
 Minor features    :Slow
 Absent features   :Presses
HOLDING STRATEGY Notable
 Major features    :none
 Notable features :none
 Minor features    :none
 Absent features   :Ends dn Slow
RUNNING STRATEGY Absent
```

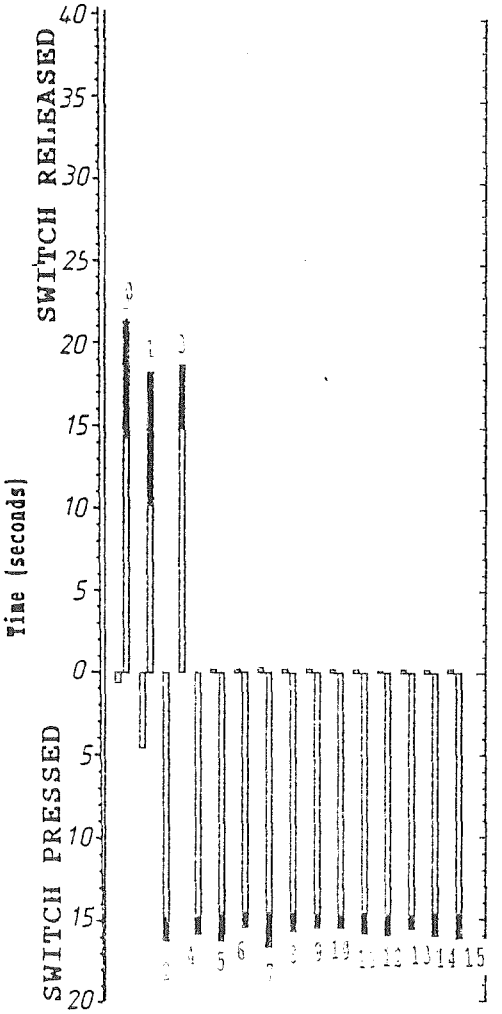


Batch 14

```
:01234567890123456:----------------------------------
:****************:UP
:      *  ******  *:DN
:      *********  :ALT?
:     ************:ADD
:     ************:ALT1
:     ************:ALT              Often      Clusters
:     *  *       *  :UNAMBIGUOUS     Sometimes  Runs
:     ************:OPTIMAL.ALT       Always     Clusters
:     ************:SIMPLE.ALT        Always     Clusters
:     ************:FAST.ALT          Always     Clusters
:                  :SLOW.ALT          Never      None
:     ************:*ALT
:01234567890123456:----------------------------------
:****************:RELEASE            Always     Block
:****************:ENDS_UP            Always     Block
:****************:SIMPLE.P/R         Always     Block
:****************:PAUSED             Always     Block
:****************:OPTIMAL.P/R        Always     Block
:****************:FEW.P/R            Always     Block
:   *  ***********:FAST.P/R          Often      Runs
:**  *            :SLOW.P/R          Infrequent Runs
:                  :PRESSES           Never      None
:****************:*P/R
:01234567890123456:----------------------------------
:      *  ******  *:HOLD             Sometimes  Runs
:                  :ENDS_DN           Never      None
:      *  ******  *:SIMPLE.HOLD      Always     Runs
:      *  ******  *:PAUSED.DN        Always     Runs
:      *  ******  *:OPTIMAL.HOLD     Always     Runs
:      *  ******  *:FEW.HOLD         Always     Runs
:      *  ******  *:FAST.HOLD        Always     Runs
:                  :SLOW.HOLD         Never      None
:      *  ******  *:*HOLD
:01234567890123456:----------------------------------
:                  :RUN
:                  :NO_TAIL
:                  :QUICK_DN
:                  :QUICK_UP
:                  :*RUN
:01234567890123456:----------------------------------
:                  :ALT  Never        None       Absent
:****************:P/R  Always       Block      Major    (good)
:                  :HLD  Never        None       Notable
:                  :RUN  Never        None       Absent
:                  :UNCLAIMED
```

Batch 19

STRATEGY FEATURES
ALTERNATING STRATEGY Minor (good)
Major features :none
Notable features :Unambiguous Fast Slow
Minor features :none
Absent features :none
PRESS/RELEASE STRATEGY Minor (good)
Major features :none
Notable features :Fast Slow
Minor features :none
Absent features :Presses
HOLDING STRATEGY Major (good)
Major features :Ends dn Fast
Notable features :none
Minor features :Slow
Absent features :none
RUNNING STRATEGY Absent

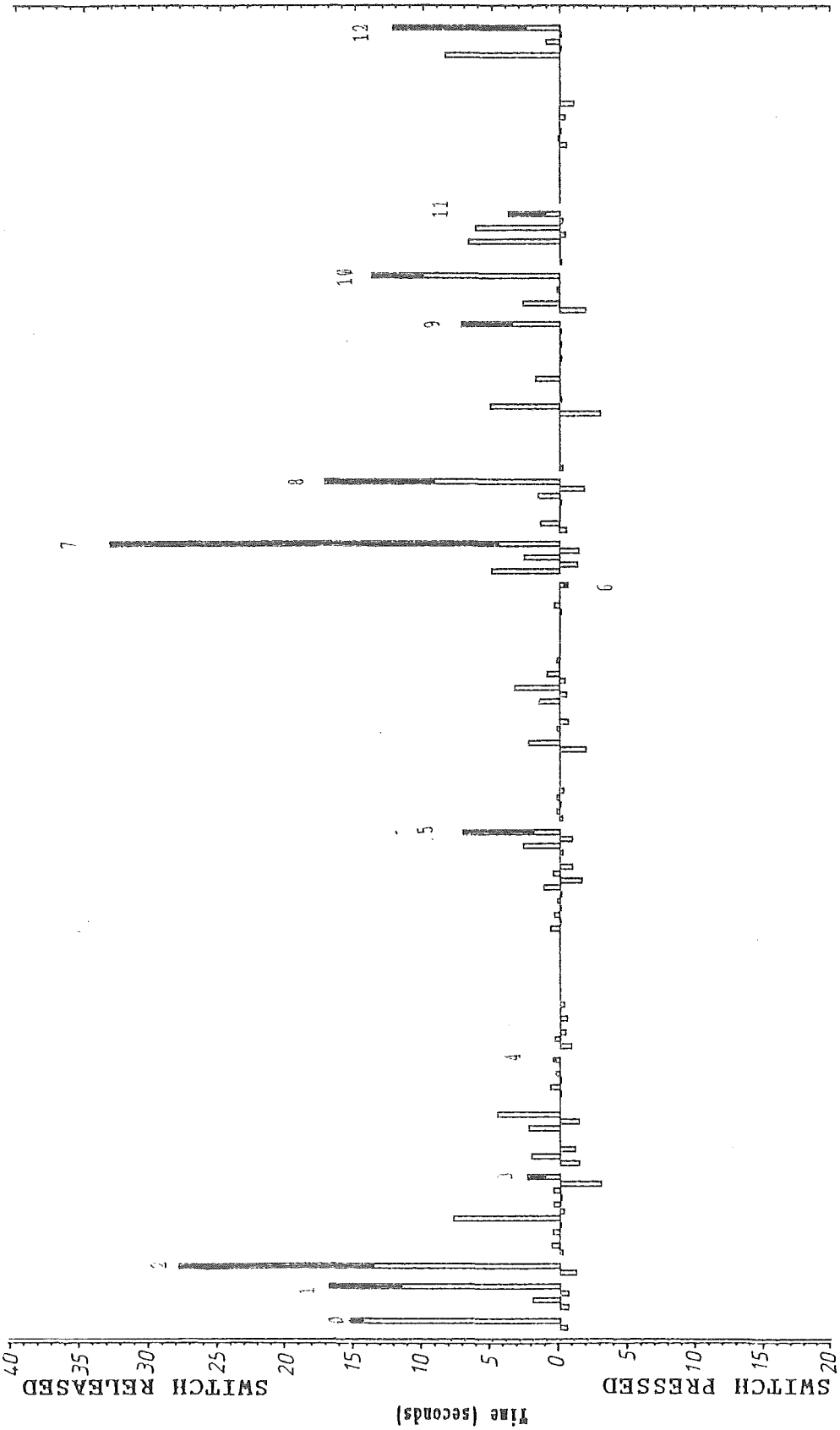


Batch 19

```
:0123456789012345:-----------------------------------
:**  *            :UP
: **  ***********:DN
:   **            :ALT?
: ****            :ADD
: ****            :ALT1
: ****            :ALT              Infrequent Clusters
:  ***            :UNAMBIGUOUS      Sometimes  Clusters
: ****            :OPTIMAL.ALT      Always     Clusters
: ****            :SIMPLE.ALT       Always     Clusters
:  ***            :FAST.ALT         Sometimes  Clusters
: *               :SLOW.ALT         Sometimes  Isolated
: ****            :*ALT
:0123456789012345:-----------------------------------
:**  *            :RELEASE          Infrequent Runs
:**  *            :ENDS_UP          Always     Runs
:**  *            :SIMPLE.P/R       Always     Runs
:**  *            :PAUSED           Always     Runs
:**  *            :OPTIMAL.P/R      Always     Runs
:**  *            :FEW.P/R          Always     Runs
:    *            :FAST.P/R         Sometimes  Isolated
:**               :SLOW.P/R         Sometimes  Clusters
:                 :PRESSES          Never      None
:**  *            :*P/R
:0123456789012345:-----------------------------------
: **  ***********:HOLD             Often      Runs
:   *  ***********:ENDS_DN          Often      Runs
: **  ***********:SIMPLE.HOLD      Always     Runs
: **  ***********:PAUSED.DN        Always     Runs
: **  ***********:OPTIMAL.HOLD     Always     Runs
: **  ***********:FEW.HOLD         Always     Runs
:   *  ***********:FAST.HOLD        Often      Runs
: *               :SLOW.HOLD        Infrequent Isolated
: **  ***********:*HOLD
:0123456789012345:-----------------------------------
:                 :RUN
:                 :NO_TAIL
:                 :QUICK_DN
:                 :QUICK_UP
:                 :*RUN
:0123456789012345:-----------------------------------
:   ***           :ALT  Infrequent Clusters   Minor   (good)
:**  *            :P/R  Infrequent Runs       Minor   (good)
:   *  ***********:HLD  Often      Runs       Major   (good)
:                 :RUN  Never      None       Absent
:                 :UNCLAIMED
```

APPENDIX 63

Batch 24



APPENDIX 64

Batch 24

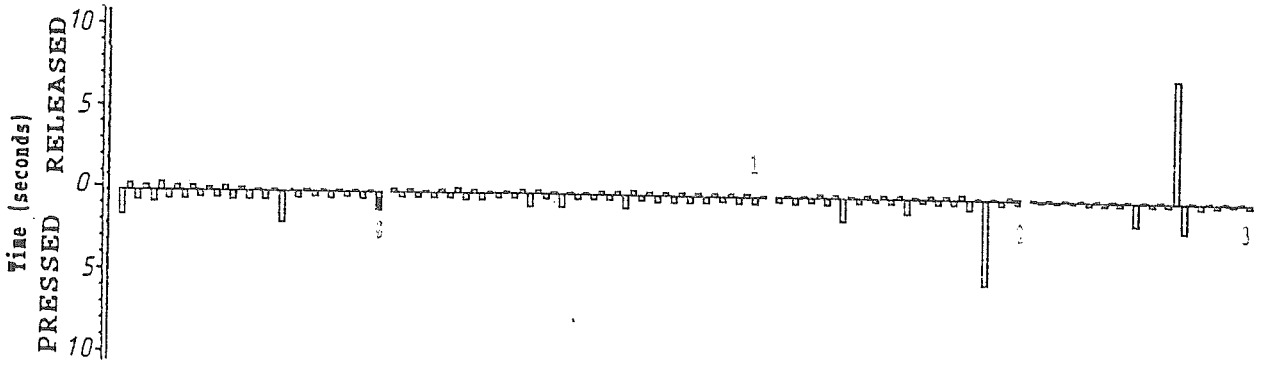
```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major    (poor)
 Major features    :Ends up
 Notable features :Fast Slow
 Minor features    :Simple Paused Optimal Few Presses
 Absent features   :none
HOLDING STRATEGY Minor    (poor)
 Major features    :none
 Notable features :none
 Minor features    :none
 Absent features   :Ends dn Simple Paused Optimal Few Slow
RUNNING STRATEGY Notable
 Major features    :Quick dn
 Notable features :No tail
 Minor features    :none
 Absent features   :Quick up
```

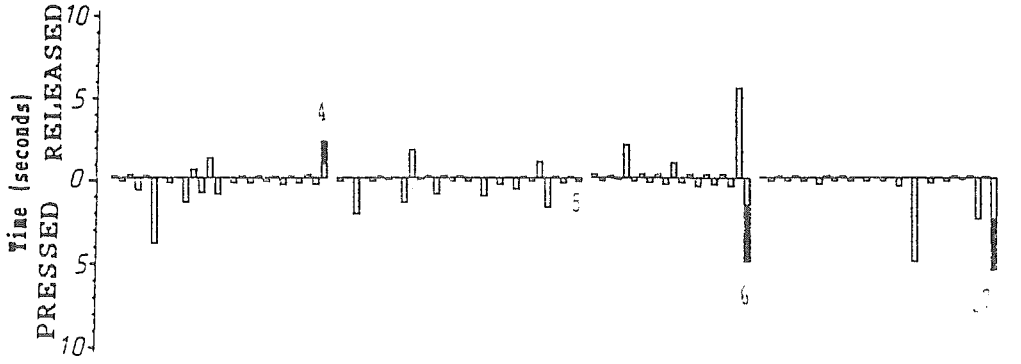
Batch 24

```
:0123456789012:-----------------------------------
:************:UP
:    *      *    :DN
:    *      *    :ALT?
:   * *    * *   :ADD
:   ***    ***   :ALT1
:                :ALT
:                :UNAMBIGUOUS
:                :OPTIMAL.ALT
:                :SIMPLE.ALT
:                :FAST.ALT
:                :SLOW.ALT
:                :*ALT
:0123456789012:-----------------------------------
:************:RELEASE          Always     Block
:***   * ******:ENDS_UP          Often      Runs
:* *      *    :SIMPLE.P/R      Infrequent Runs
:* *           :PAUSED          Infrequent Runs
:* *           :OPTIMAL.P/R     Infrequent Runs
:***           :FEW.P/R         Infrequent Clusters
:*  ** *  *** :FAST.P/R         Sometimes  Runs
: **   * **   *:SLOW.P/R         Sometimes  Runs
:        *   **:PRESSES         Infrequent Runs
:***   * ******:*P/R
:0123456789012:-----------------------------------
:    *      *    :HOLD            Infrequent Runs
:                :ENDS_DN         Never      None
:                :SIMPLE.HOLD     Never      None
:                :PAUSED.DN       Never      None
:                :OPTIMAL.HOLD    Never      None
:                :FEW.HOLD        Never      None
:    *      *    :FAST.HOLD       Always     Runs
:                :SLOW.HOLD       Never      None
:    *      *    :*HOLD
:0123456789012:-----------------------------------
:     ***   *   *:RUN             Sometimes  Runs
:     * *         :NO_TAIL         Sometimes  Runs
:     ***        *:QUICK_DN        Often      Clusters
:                 :QUICK_UP       Never      None
:     ***        *:*RUN
:0123456789012:-----------------------------------
:                :ALT  Never      None       Absent
:**** * ******:P/R  Often      Runs       Major    (poor)
:    *      *    :HLD  Infrequent Runs       Minor    (poor)
:     ***   *   *:RUN  Sometimes  Runs       Notable
:                :UNCLAIMED
```

Batch 27

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Notable
 Major features    :none
 Notable features :none
 Minor features    :none
 Absent features   :Ends up Simple Paused Optimal Few Slow Presses
HOLDING STRATEGY Notable (poor)
 Major features    :none
 Notable features :Ends dn
 Minor features    :none
 Absent features   :Simple Paused Optimal Few Slow
RUNNING STRATEGY Major    (good)
 Major features    :No tail
 Notable features :Quick dn Quick up
 Minor features    :none
 Absent features   :none
```



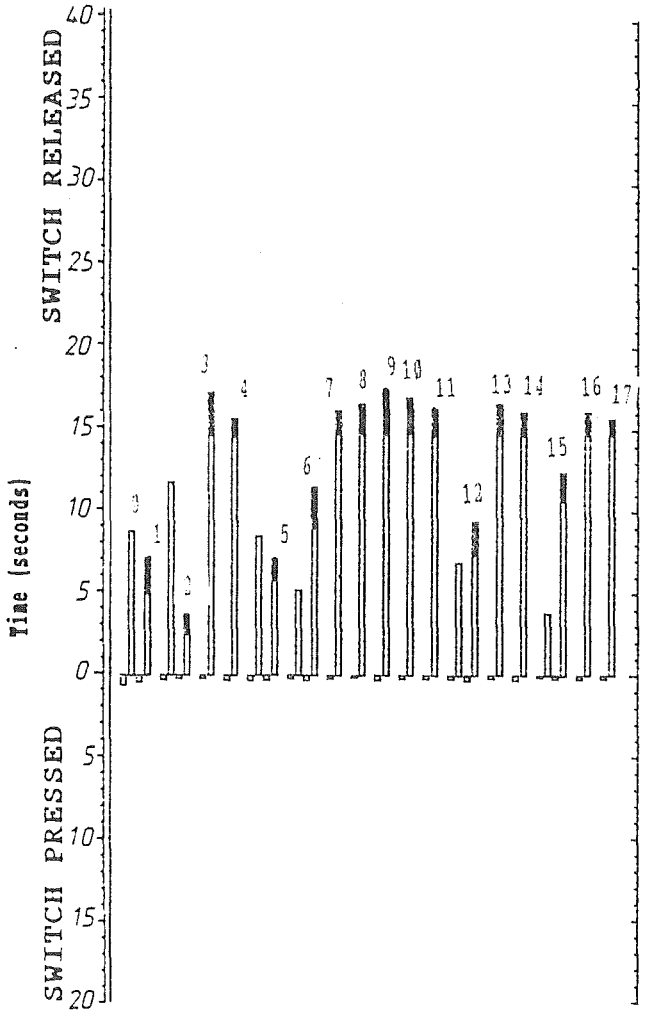


Batch 27

```
:Ø1234567:-----------------------------------
:    *   * :UP
:   * * ** :DN
:    *     :ALT?
:   * *    :ADD
:   ***    :ALT1
:          :ALT
:          :UNAMBIGUOUS
:          :OPTIMAL.ALT
:          :SIMPLE.ALT
:          :FAST.ALT
:          :SLOW.ALT
:          :*ALT
:Ø1234567:-----------------------------------
:    *   * :RELEASE          Sometimes  Runs
:          :ENDS_UP          Never      None
:          :SIMPLE.P/R       Never      None
:          :PAUSED           Never      None
:          :OPTIMAL.P/R      Never      None
:          :FEW.P/R          Never      None
:    *   * :FAST.P/R         Always     Runs
:          :SLOW.P/R         Never      None
:          :PRESSES          Never      None
:    *   * :*P/R
:Ø1234567:-----------------------------------
:   * * ** :HOLD             Sometimes  Runs
:       ** :ENDS_DN          Sometimes  Clusters
:          :SIMPLE.HOLD      Never      None
:          :PAUSED.DN        Never      None
:          :OPTIMAL.HOLD     Never      None
:          :FEW.HOLD         Never      None
:   * * ** :FAST.HOLD        Always     Runs
:          :SLOW.HOLD        Never      None
:   * * ** :*HOLD
:Ø1234567:-----------------------------------
:******** :RUN               Always     Block
:*******  :NO_TAIL           Often      Block
:** *     :QUICK_DN          Sometimes  Runs
:***   * *:QUICK_UP         Sometimes  Runs
:******** :*RUN
:Ø1234567:-----------------------------------
:          :ALT  Never       None       Absent
:          :P/R  Never       None       Notable
:         *:HLD  Infrequent  Isolated   Notable  (poor)
:******** :RUN  Always       Block      Major    (good)
:          :UNCLAIMED
```

Batch 29

STRATEGY FEATURES
ALTERNATING STRATEGY Absent
PRESS/RELEASE STRATEGY Major
 Major features :Ends up Few Fast
 Notable features :Simple Paused Optimal Presses
 Minor features :none
 Absent features :Slow
HOLDING STRATEGY Absent
RUNNING STRATEGY Absent



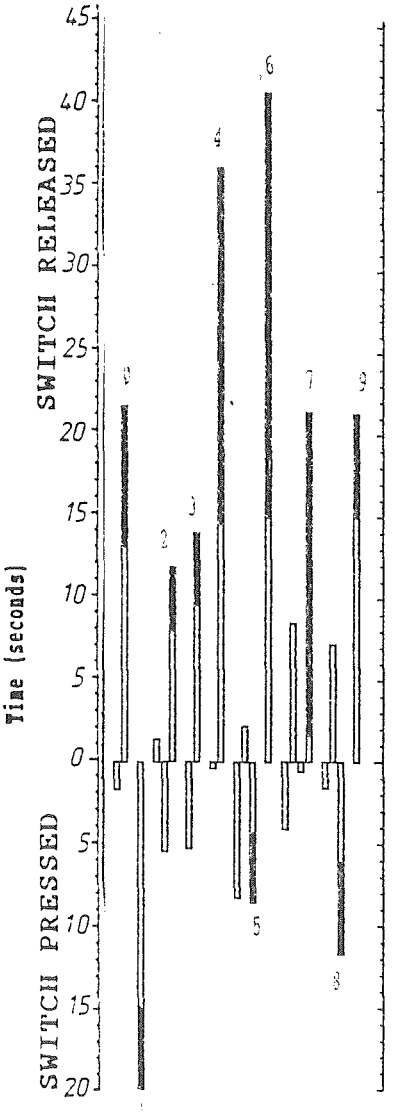
Batch 29

```
:Ø1234567890123456:-----------------------------------
:******************:UP
:                  :DN
:                  :ALT?
:                  :ADD
:                  :ALT1
:                  :ALT
:                  :UNAMBIGUOUS
:                  :OPTIMAL.ALT
:                  :SIMPLE.ALT
:                  :FAST.ALT
:                  :SLOW.ALT
:                  :*ALT
:Ø1234567890123456:-----------------------------------
:******************:RELEASE          Always     Block
:******************:ENDS_UP          Always     Block
:  **  ***** ** **:SIMPLE.P/R       Sometimes  Runs
:  **  ***** ** **:PAUSED           Sometimes  Runs
:  **  ***** ** **:OPTIMAL.P/R      Sometimes  Runs
:******************:FEW.P/R         Always     Block
:******************:FAST.P/R        Always     Block
:                  :SLOW.P/R        Never      None
:**  **     *  *  :PRESSES         Sometimes  Runs
:******************:*P/R
:Ø1234567890123456:-----------------------------------
:                  :HOLD
:                  :ENDS_DN
:                  :SIMPLE.HOLD
:                  :PAUSED.DN
:                  :OPTIMAL.HOLD
:                  :FEW.HOLD
:                  :FAST.HOLD
:                  :SLOW.HOLD
:                  :*HOLD
:Ø1234567890123456:-----------------------------------
:                  :RUN
:                  :NO_TAIL
:                  :QUICK_DN
:                  :QUICK_UP
:                  :*RUN
:Ø1234567890123456:-----------------------------------
:                  :ALT  Never      None       Absent
:******************:P/R  Always     Block      Major
:                  :HLD  Never      None       Absent
:                  :RUN  Never      None       Absent
:                  :UNCLAIMED
```

APPENDIX 70

Batch 30

```
**STRATEGY FEATURES**
ALTERNATING STRATEGY Notable (good)
 Major features    :none
 Notable features :Unambiguous Optimal Simple Fast Slow
 Minor features    :none
 Absent features   :none
PRESS/RELEASE STRATEGY Major
 Major features    :Ends up Slow
 Notable features :Simple Paused Optimal Fast
 Minor features    :none
 Absent features   :Presses
HOLDING STRATEGY Notable
 Major features    :none
 Notable features :Ends dn Simple Paused Optimal Fast Slow
 Minor features    :none
 Absent features   :none
RUNNING STRATEGY Absent
```



Batch 30

```
:Ø123456789:-----------------------------------
:*  ***  ****:UP
: ***  *  **  :DN
: ********     :ALT?
:**********:ADD
:**********:ALT1
:**********:ALT                Always      Block
:**   ***   *:UNAMBIGUOUS      Sometimes   Runs
:** **  *   *:OPTIMAL.ALT      Sometimes   Runs
:** **  *   *:SIMPLE.ALT       Sometimes   Runs
:   **  *     :FAST.ALT         Sometimes   Runs
:**   *  ****:SLOW.ALT         Sometimes   Runs
:**********:*ALT
:Ø123456789:-----------------------------------
:*  ***  ****:RELEASE          Often       Runs
:*  ***  **  *:ENDS_UP         Often       Runs
:*   **  *   *:SIMPLE.P/R      Sometimes   Runs
:*   **  *   *:PAUSED          Sometimes   Runs
:*   **  *   *:OPTIMAL.P/R     Sometimes   Runs
:*  ***  ****:FEW.P/R          Always      Runs
:   **        :FAST.P/R         Sometimes   Runs
:*    *  ****:SLOW.P/R         Often       Runs
:             :PRESSES          Never       None
:*  ***  ****:*P/R
:Ø123456789:-----------------------------------
: ***  *  **  :HOLD            Sometimes   Runs
: *    *   *  :ENDS_DN         Sometimes   Runs
: *  *        :SIMPLE.HOLD     Sometimes   Runs
: *  *        :PAUSED.DN       Sometimes   Runs
: *  *        :OPTIMAL.HOLD    Sometimes   Runs
: ***  *  **  :FEW.HOLD        Always      Runs
:   **  *     :FAST.HOLD        Sometimes   Runs
: *       **  :SLOW.HOLD        Sometimes   Runs
: ***  *  **  :*HOLD
:Ø123456789:-----------------------------------
:             :RUN
:             :NO_TAIL
:             :QUICK_DN
:             :QUICK_UP
:             :*RUN
:Ø123456789:-----------------------------------
:**           :ALT  Sometimes  Clusters   Notable (good)
:*  ***  ****:P/R  Often      Runs       Major
: **   *  **  :HLD  Sometimes  Runs       Notable
:             :RUN  Never      None       Absent
:             :UNCLAIMED
```